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ABSTRACT

A training effectiveness evaluation of the Navy Advanced Fire Fighting Training System was conducted. This system incorporates simulated fires as well as curriculum materials and instruction. The fires are non-pollutant, computer controlled, and installed in a simulated shipboard environment. Two teams of 15 to 16 persons, with varying amounts of fire-fighting experience, were involved in the evaluation. Both performance and knowledge testing were used and a student attitude questionnaire was administered. In addition, specific observations were made of the components of the overall training system. It was determined that the training device provides effective training for fire fighting. Recommendations for modifications in the system and the supporting components were made following the evaluation. (KC)

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Technical Report 142

TRAINING EFFECTIVENESS EVALUATION (TEE) OF THE ADVANCED FIRE FIGHTING TRAINING SYSTEM

Curtis C. Cordell
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Training Analysis and Evaluation Group

February 1983

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A Training Effectiveness Evaluation was conducted of the Navy Advanced Fire Fighting Training System which incorporates simulated fires. These fires are non-pollutant, computer controlled, and installed in a simulated shipboard environment. It was found that the fires are sufficiently realistic that positive training did occur.

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SECTION I

INTRODUCTION

Device 19F1, Advanced Fire Fighting Trainer (AFFT), Surface, was developed by the Naval Training Equipment Center (NAVTRAEQUIPCEN) and installed at the Fire Fighting School, Fleet Training Center (FTC), Norfolk, Virginia. Subsequent to Government acceptance testing, completed on 18 May 1982, a Training Capabilities Test (TCT) was conducted by the Fleet Project Team during the week of 14 June 1982. The Training Analysis and Evaluation Group (TAEG) performed a Training Effectiveness Evaluation (TEE) during the period 13-27 September 1982 in response to CNET tasking.[1] The present report is an account of the TAEG evaluation.

The requirement for all officers and enlisted personnel to participate in live fire fighting training has been mandated by the Chief of Naval Operations (CNO) in OPNAVINST 3541 (series). Existing fire fighting training facilities provide students with the capability of fighting actual fires; however, the fires violate air quality and/or effluent standards established by Federal and state environmental protection agencies.

On 20 July 1976 the Navy issued Operational Requirement, Advanced Fire Fighting Simulator (OR PN-51) which established the requirement for a non-pollutant trainer.

Prior to Naval Decision Coordinating Paper (NDCP) approval, a Detailed Military Characteristics (MC) for an Advanced Fire Fighting Simulator (Surface), Device 19F1, MC number 2248, was issued (December 1978). The detailed specifications contained in the contract for Device 19F1 did not include the structure into which it was to be installed. While the building was erected on the fire field specifically to house the device, it was designed and constructed prior to completion of device design. This feature influences the outcome of the TEE.

Technically, Device 19F1 consists only of a number of fireplaces. However, these fireplaces cannot be effectively evaluated except in the environment they are installed, in conjunction with supporting subsystems (which include a replication of the shipboard environment), and with provision for the safety of involved personnel. The study emphasized the evaluation of the total training system and, in addition, detailed analyses of the component subsystems which contribute to the overall system operation. Five components are subsumed under the training system. These are:

- publications
- Device 19F1
- structure
- supporting subsystems
- curriculum.

[1]CNET message 222349Z of January 1980

PURPOSE

The purpose of this evaluation is to determine the effectiveness of the Device 19F1 training system environment for Navy fire fighting training.

CONSTRAINTS

The TEE was conducted in a test environment wherein a number of constraints were identified. These constraints influenced the test plan and the technical approach employed. The most prominent are identified below.

- **Adequacy of Test Sample.** Only two test teams were available for the evaluation. This small number resulted in an inability to establish adequate norms upon which to base representative or average skill measures.

- **Total System Not Available.** One-half of the training structure was not operative as no fireplaces had been installed. Only a limited number of fires could be addressed, 12 for each team. These 12 fires were one practice (no or very limited smoke) and one graded exercise for each fire.

- **Modifications Made to the Structure.** The structure had been extensively modified between Government Acceptance and the TEE. Some of the modifications were installed subsequent to the TCT.

- **Inexperience of Instructors.** The instructors had little opportunity to operate the device in a training situation prior to the TEE. Only two courses had been conducted prior to the evaluation. The instructors were not able to use the system to its maximum capability.

In addition to the constraints enumerated above, a variety of malfunctions in both hardware and software were experienced. These malfunctions were due primarily to the recency of the device coming on line. None were serious enough to compromise the study outcomes.

The above features and the restrictions in the time available from Government Acceptance and the TCT to the scheduled TEE necessitated making certain accommodations in the design and the conduct of the study.

The problems, however, were anticipated and minimized by having TAEG personnel on-site during the entire evaluation to monitor and assist in the data collection and to control the test procedures employed. All told, this "in situ" approach contributed to the assurance of relevant evaluations within a tolerable range of experimental control.

The remainder of this report describes the system evaluated, the method employed, and the findings and recommendations.

SECTION II

SYSTEM DESCRIPTION

Figure 1 depicts the relationship among the components of the fire fighting training system. These components, as listed in section I, are described in detail below.

PUBLICATIONS

At this time, maintenance is performed by the contractor; however, in time and on subsequent devices modeled on the 19F1, it is anticipated that naval personnel will be responsible for both operation and maintenance. Therefore, the Instructor/Operator Training Course Student's Guide Volume 1 For Advanced Fire Fighting Trainer, Device 19F1 (Advanced Technology Systems, 1980), which is the contractor supplied manual for operators and maintenance personnel, was subjected to a reading level test. The final version of the manual was not used since it was not available.

DEVICE 19F1

FIREPLACES. Seven fireplaces equipped with propane burners were available to simulate Class A, B, and C types of fires. The fires were: oil spray and bilge, electrical, trash can, deep fat fryer and stack hood (two fireplaces), mattress, and storage compartment. The number of individual burners per fireplace varied with the required extent of the fire. There was a non-extinguishable pilot flame for each burner. Each burner program was controlled through a modulator valve to vary flame size, growth, and spread.

The Oil Spray/Bilge fireplace simulates a fire emergency occurring in the bilge of a machinery space of a vessel caused by combustible oil being ignited. The fireplace covers a base area of approximately 4 X 8 feet. The burners are staggered to provide the realism of flame spread and growth; sensors are located throughout the area of application to detect the extinguishing agent(s). Other sensors, to detect "digging" with a solid stream of water, are located to prevent being stepped on. Pilot burners are located to preclude extinguishment by the PKP substitute.

The Electrical Panel fireplace simulates a fire within an electrical panel caused by short-circuit, overload, or other failure. One burner provides the fire. The flame comes from the rear through the panel and projects upward. Sensors are located to detect extinguishment agents applied horizontally.

The Deep Fat Fryer/Stack Hood fireplace simulates a grease fire that would be encountered if the fryer/stack hood in the galley was improperly or negligently operated. Each fireplace, the fryer and stack hood, requires a separate burner and program. Extinguishing agents in the stack hood are detected from an upward direction and from semi-blocked directions in the deep fat fryer. This precludes extinguishment unless trainees are in front of the fryer.

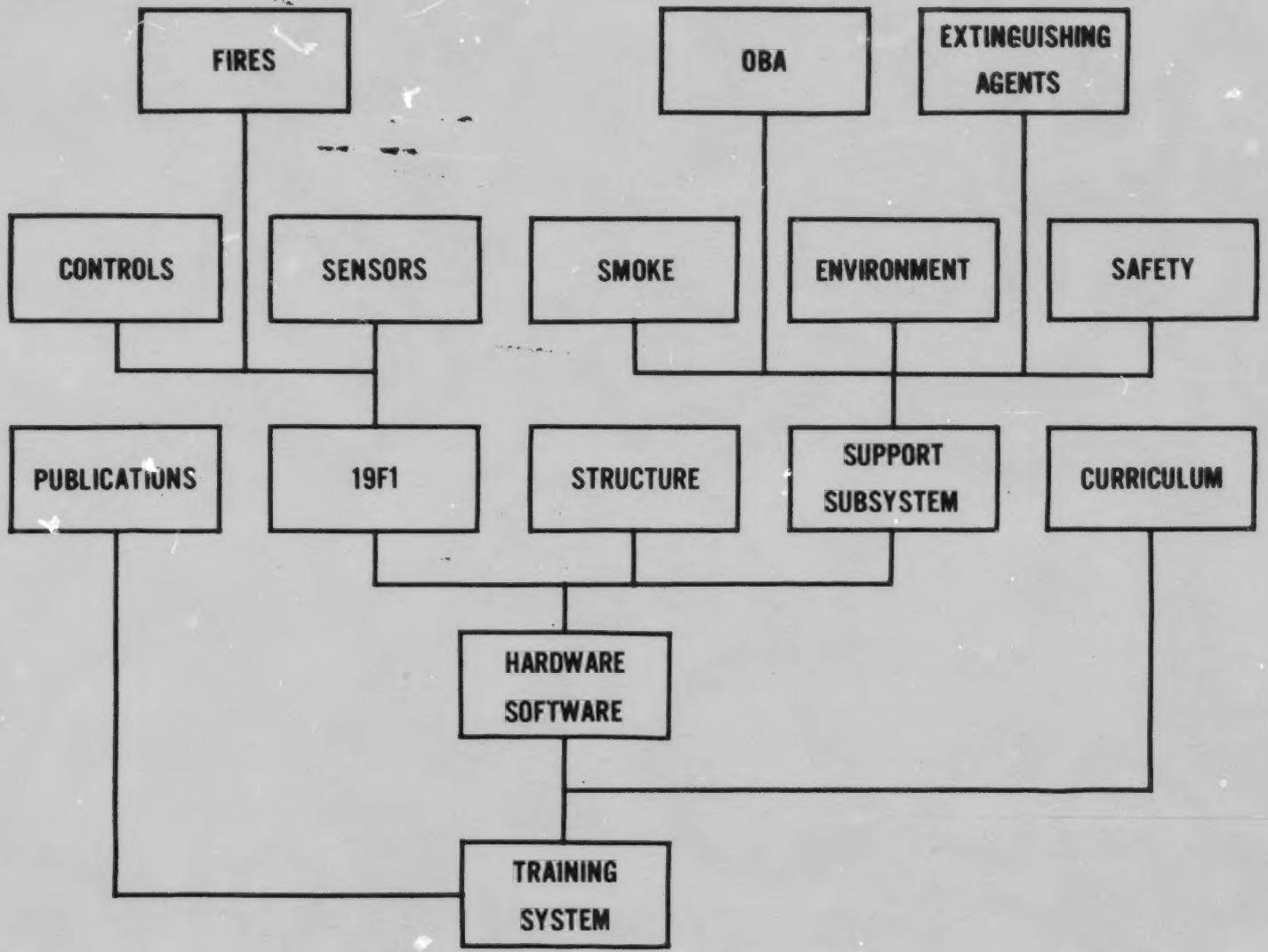

Figure 1. Fire Fighting Training System

The Mattress fireplace simulates a burning mattress found in a typical berthing space onboard ship. The fire starts below the surface of the mattress grill and eventually engulfs the burn area of the mockup. The initial flame produces considerable heat. Sensors detect the application of water and cause the fire to reflash if the mattress is not soaked sufficiently.

The Storage Compartment fireplace simulates a typical storage compartment onboard ship. The compartment consists of a wire mesh, functional door, and simulated wooden and cardboard boxes. The fire starts at the base and behind the stack of boxes and spreads throughout the compartment. Sensors detect the application of water and cause the fire to reflash if the simulated boxes are not soaked for the required time period.

The Trash Can fireplace is a substitute for the rag bale fire described in the MC for Device 19F1. During the TCT it was decided that the rag bale fire was not an effective training fire, hence, the substitution. The trash can fire simulates a typical metal garbage can located in a ship's passage. The fire starts in the bottom of the can with flames growing to just beyond the lip. Sensors detect the application of water, but insufficient soaking will cause a reflash. Should the trash can be raised (to remove from the compartment), there is an automatic propane shut-off interlock which prevents the release of propane into the compartment.

CONTROLS. Activation and control of the fireplaces is at the instructor's console located in a booth at the roof level of the structure. The control system interface is shown in the schematic presented in figure 2. The system contains all of the controls necessary to initiate a fire and establish the growth, spread, and reflash rates, as well as the soaking and extinguishment time periods for each fire. By adjusting these parameters, either manually or automatically, the instructor can simulate various fire types, the amount of fuel available, and the fire size. Alarms and indicators are provided to monitor fire status and alert the instructor to any hazardous conditions in the simulator or training area.

All fire-generation and control signals from the instructor's console are routed through a programmable controller. The controller scans the inputs from the console and establishes whether the input status meets the circuit conditions stored in memory. Based on the input status and stored circuit conditions, the controller generates the appropriate output signals to the various trainer units. The output signals control the motorized valves, solenoids, relays, and electronic units used to simulate the appropriate fire conditions. As the training exercise progresses and trainee interaction occurs (the application of extinguishment agents), the extinguishment sensor system detects the application and feeds data back to the controller. The controller then matches the feedback data with the entered parameter data and varies the flame output of the fireplace burners.

SENSORS. To achieve the correct appearance of extinguishing the fire, each fireplace is equipped with a system to detect flame height and quantity, and the location and type of extinguishing agent. The system differentiates among the application of water, PKP substitutes, and Aqueous Film Forming

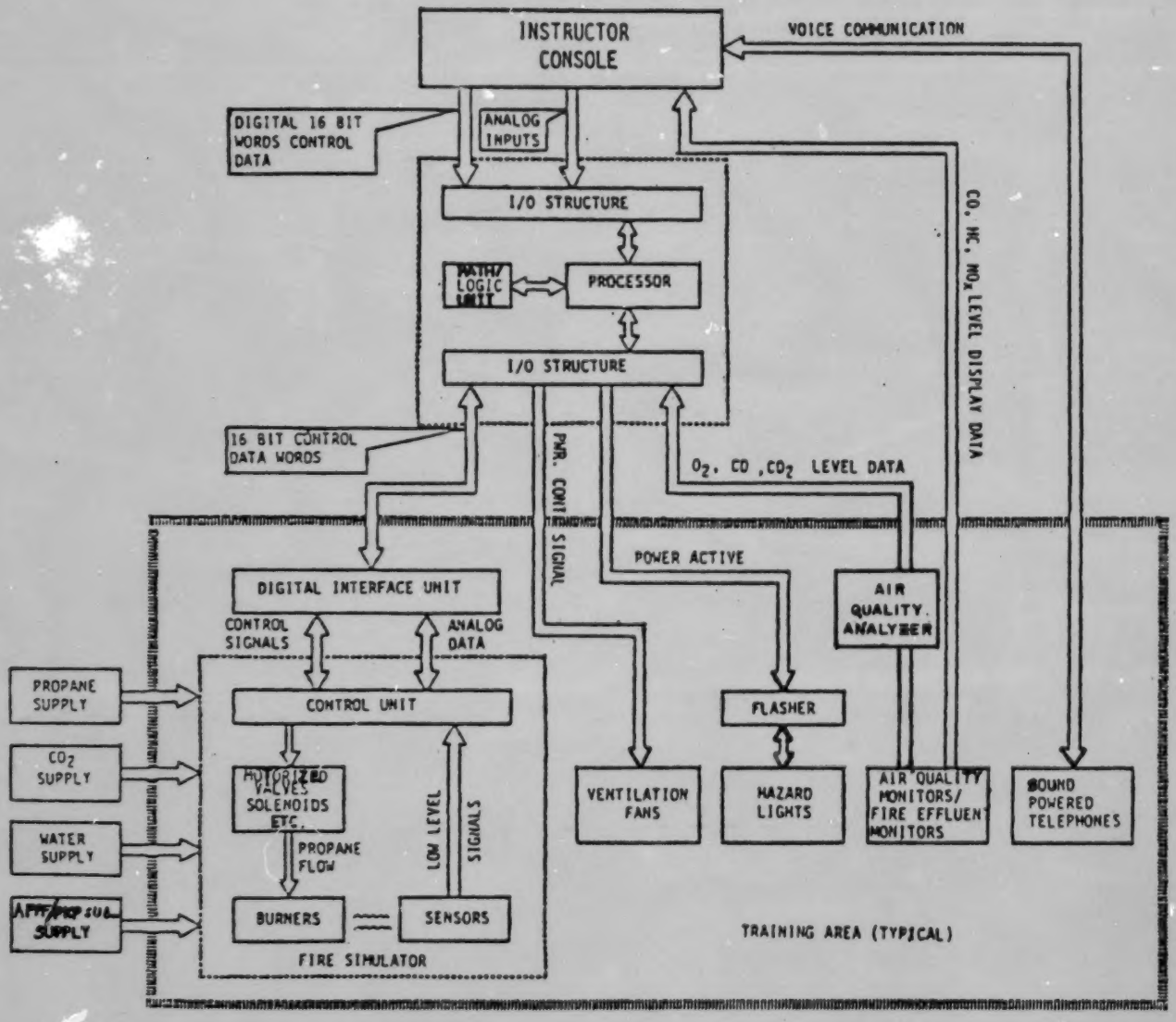

Figure 2. AFFT Control System Interface

Foam (AFFF) substitutes through liquid level sensors, ultraviolet flame detectors, and retro-reflective-pulsed LED photodetectors. These sensors respond to the various extinguishing agents used on the fire. Signals from the sensors are fed into the digital controller which determines the degree of extinguishment for a particular burner and adjusts propane supply accordingly. Realism is achieved through placement of the burners and sensors and through the time delays for reaction to extinguishment actions, reflash (the interaction of adjacent burners to produce flame spread over an area), and torching.

STRUCTURE

The structure (building No. 8 on the fire field) was designed and erected prior to the completion of the design of the fireplaces. This premature construction has caused the building to be modified extensively from the one described in the MC. Figures 3, 4, and 5 depict the configuration of the training building as it existed during the TEE. Only the operational half of the structure is shown. Major structure modifications are discussed in the following paragraphs.

ROOF (figure 3).

1. The afterburner has been removed and the smoke generating equipment installed in its place.

2. A portable pump and 55 gallon storage container are maintained on the roof. The purpose of this installation is to provide AFFF agent substitute to the installed Twin Agent Fire Extinguishing System (TAFES) unit.

3. Repair lockers have been installed on opposite sides of the roof and extend beyond the building edge.

4. An open platform has been installed opposite the instructor's station which extends beyond the building edge.

UPPER DECK (figure 4).

1. The upper deck contains a simulated galley and mess deck. The galley is at the foot of the ladder; the mess deck is entered from a passage through a door.

2. The trash can fire is in the passage behind the door to the mess deck.

3. Entrance to the galley has been moved from opposite the door to the mess deck to the interior bulkhead opposite the ladder. The former opening has been closed permanently.

4. A remote oil shut-off valve for the bilge/oil spray fire has been installed in the passage.

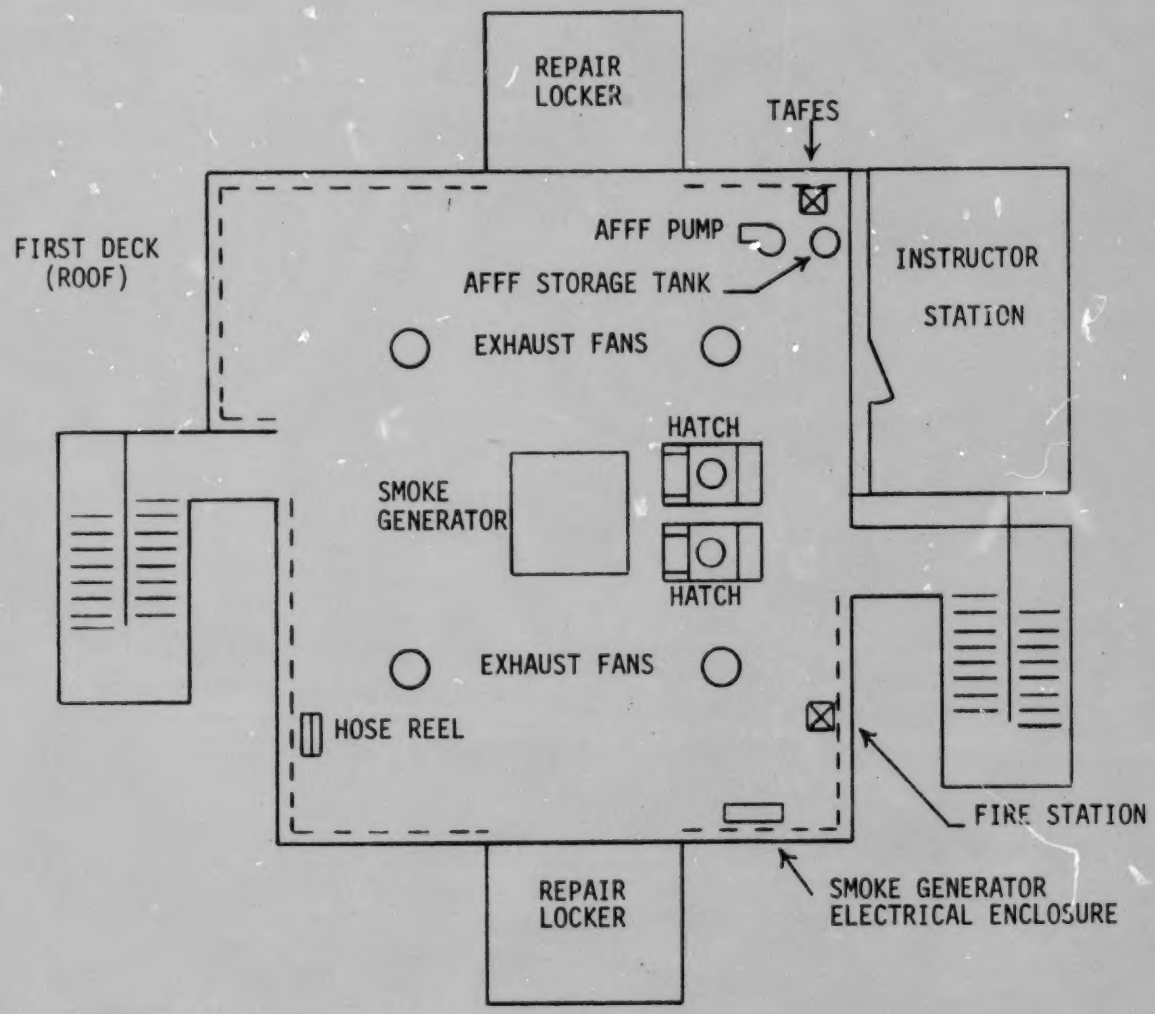

Figure 3. Structure 8 Roof

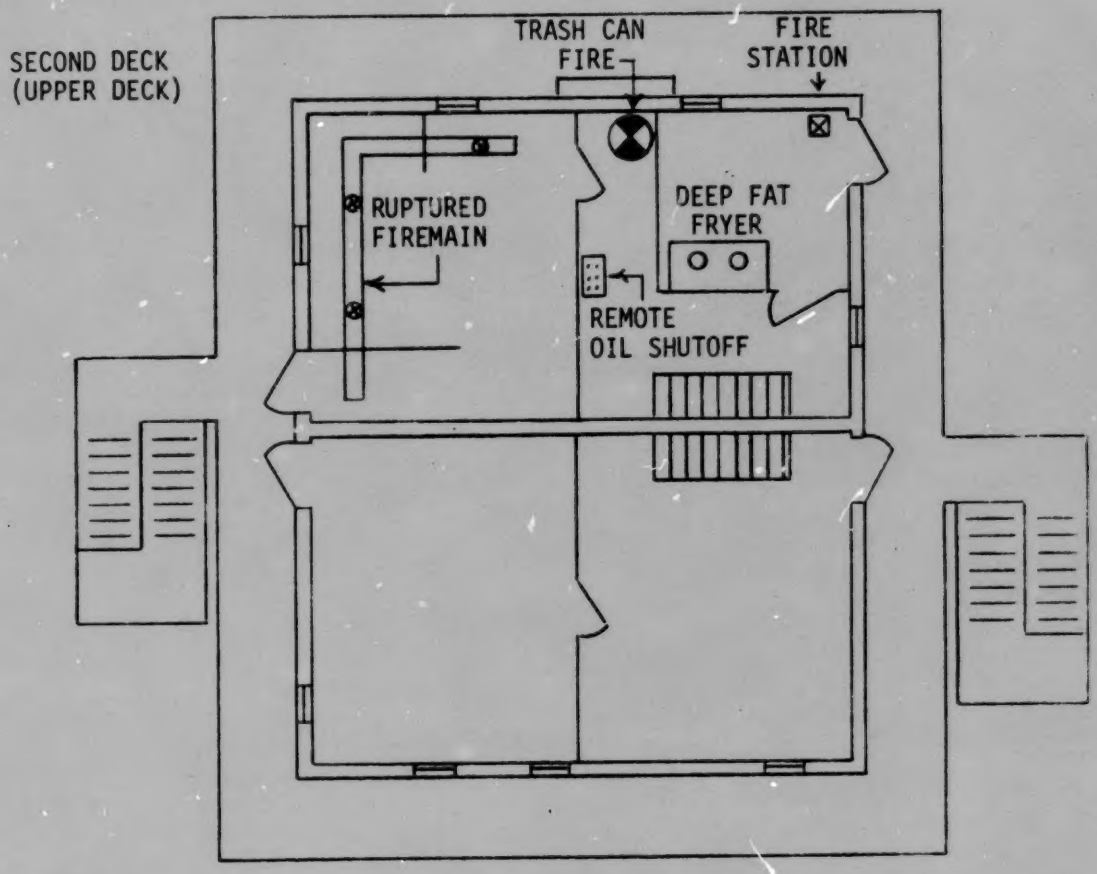

Figure 4. Upper Deck, Quadrant II

5. There are no fires in the mess deck; however, a simulated firemain has been installed with three cut-off valves. The main, when charged from an external source, simulates a ruptured firemain. This addition to the structure permits the device to meet the requirements of section IIC(3)(b) of the MC.

In addition to the deck grating, a solid sheet of metal has been added to the underside of the grating. This sheet partially deflects the heat generated by the oil spray/bilge fireplace located directly beneath the mess deck.

LOWER DECK (figure 5). The lower deck is divided into a simulated berthing compartment and a simulated engineering space. The ladder descends into the berthing compartment.

1. Beneath and behind the ladder is the mattress fire.

2. The storage compartment door faces the outside entrance and is expanded metal, not solid. The interior bulkhead facing the ladder is solid. This compartment is in the berthing compartment.

3. The door to the engineering space has been replaced with a watertight (WT) door.

4. The electric panel has had a door installed. It is located on the outside bulkhead opposite the entrance and behind the oil spray/bilge fire.

5. A simulated piece of machinery has been installed to the left of the egress directly beneath the vertical ladder. The vertical ladder is no longer usable.

FUEL. Propane is piped to the fireplaces from an underground storage tank. It enters the structure through two blocking valves with a bleed (pressure release) valve between the blocking valves. Wherever possible, propane piping is exterior to the structure.

SUPPORT SUBSYSTEMS

Five primary support subsystems were identified as required to support training. Each subsystem was evaluated during the TEE. The systems are:

- smoke
- Oxygen Breathing Apparatus (OBA)
- environment
- extinguishing agents
- safety

SMOKE. Chem Chex 220, Triarylphosphate, is the commercial product used for smoke generation. This substance was recommended in the Fire Fighter Trainer Environmental Considerations, Phase II (Booz, Allen, Hamilton, Inc., 1981) study. The substance is fed to the smoke generator on the roof, heated, atomized, and disbursed to the various fireplaces and compartments only on

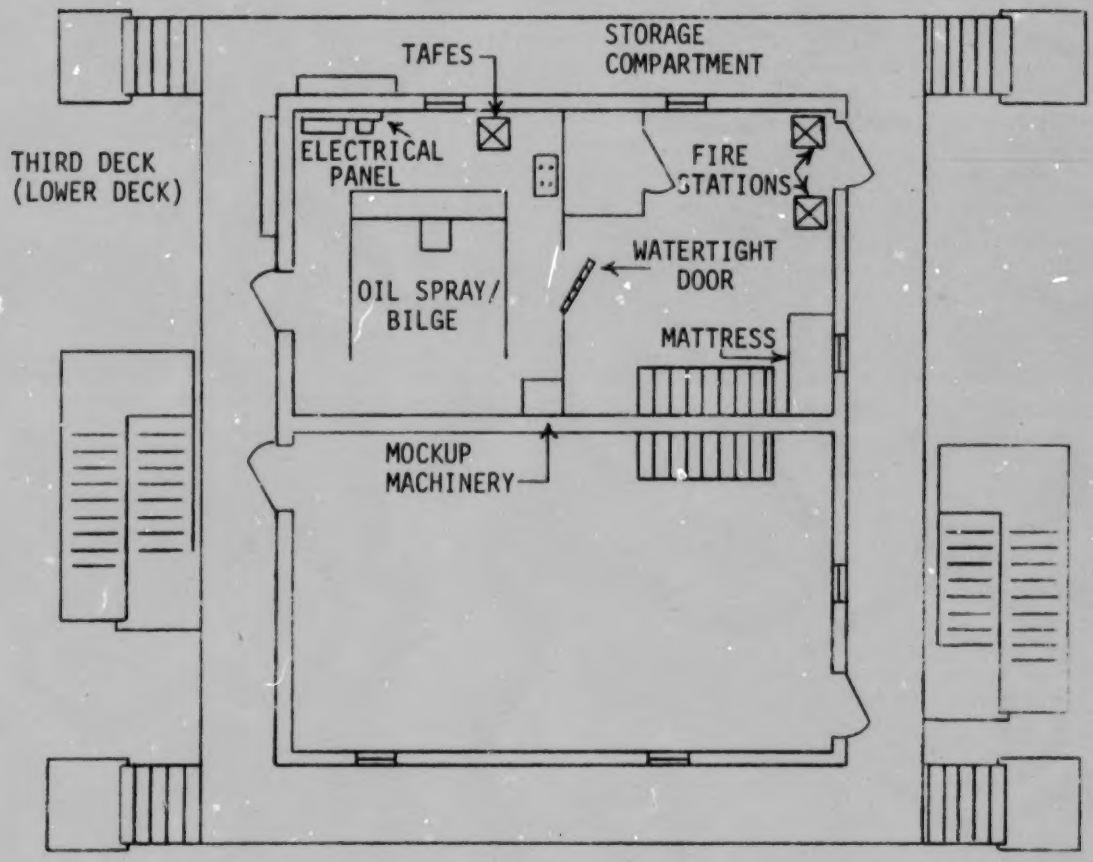

Figure 5. Lower Deck, Quadrant II

order from the control console. Smoke can be programmed or inserted into any compartment irrespective of the fire situation.

OBA. Operational OBAs with canisters are used. The development of a training OBA which uses training canisters has not been completed.

ENVIRONMENT. A Beckman air quality control monitor system is installed. Air in the structure and exhaust vents is sampled at various points. The monitor is located behind the instructor in the instructor's station with readouts on the instructor's console. Visual and audio alarms on the monitor station are activated when preset standards are exceeded; however, not all audio alarms were active during the TEE. There is a readout on the instructor's console for O_2, NO_x, CO, CO_2, hydrocarbons, and propane, but these are not alarmed. High propane mixture will cause an automatic shutdown of the entire device to include electric power within the structure (excluding the instructor's station); exhaust fans remain active.

EXTINGUISHING AGENTS. Four agents are used in the trainer to extinguish fires: water, simulated PKP, simulated AFFF, and CO_2. Sensors are located at each fireplace which are capable of distinguishing among the applied agents. Use of the improper extinguishing agent(s) will preclude fire extinguishment. In addition, the instructor has readouts on the console which permit the identification of the agent used, time on, time off, and total time applied. In the event water is the agent, the instructor can determine whether a solid stream or high velocity fog is applied.

CO_2 and PKP portable containers are available throughout the structure. Fire stations are located in all compartments except the mess deck and engineering space. A TAFES unit is installed in the engineering space. There are fire stations on the roof.

SAFETY. The following summarizes the major installed safety features. In addition, standing orders have been issued which emphasize the care and respect with which this training system must be viewed.

1. A "trainer-on" light is installed in each compartment. This is a blinking red light which indicates power is available and the trainer fires can be ignited.

2. Emergency shutdown switches are located within the structure adjacent to each door leading to the outside of the trainer. An emergency shutdown switch is located on the instructor's console. These switches cut all electrical power to the trainer (excluding exhaust fans) and close installed propane valves. Thus, activation renders the trainer totally inoperative.

3. There is an emergency escape door in each compartment leading to the outside.

4. Emergency shutdown switches are located outside of and adjacent to each door leading into the structure.

5. There are two ports in each compartment for exterior viewing of the trainees during exercises.

6. High propane concentrations activate visual and audio alarms and, simultaneously, shut down the trainer and activate the exhaust fans.

7. High concentrations of CO, CO_2, NO_X, and hydrocarbons activate a visual and audio alarm on the Beckman air quality control monitor.

8. Low O_2 activates a visual and audio alarm on the Beckman air quality control monitor.

9. A general announcing system is installed with speakers in each compartment and on the roof.

10. A sound powered telephone system is installed. This is manned by an instructor at the fire scene.

11. There is a ventilation system installed which uses two 5000 cfm axial flow fans. Air is drawn from beneath the structure and exhausted to the atmosphere above the roof.

12. High temperature sensors are installed in the exhaust stacks which, when the temperature exceeds preset levels, shut the trainer down.

CURRICULUM

A new course, J-495-0424, Advanced Fire Fighting Team Training Course, was developed specifically for this training system. This is a 2-day course designed to train intact, existing, underway and inport fire fighting and damage control teams from operational ships. There are two prerequisites to the course. All members of the team must complete the Personnel Qualification Standards (PQS) for their position and all members of the team must complete the General Shipboard Fire Fighting Course, J-495-0412.

The curriculum, designed specifically to fit the hardware and software capabilities of Device 19F1, consists of one-half day classroom instruction during which individual duties are reviewed and 1½ days actual fire fighting. The curriculum calls for a total of 20 fires. Six "practice" fires are fought in the structure without smoke. This is followed by two sets of six graded fires with smoke. Lastly, two additional repeat fires are fought and graded. These two fires are selected by the instructor from among those which the team found to be the most difficult. Subsequent to each fire, practice or graded, the team's actions are critiqued.

SECTION III

METHOD

The training effectiveness of the advanced fire fighting training system was assessed using the empirical noncomparative evaluation technique. The empirical noncomparative control group, instead of being a group of students, is the course objectives. These objectives are used as a standard against which the experimental group(s); i.e., actual students, are compared.

The evaluation involved three classes of results of training: changes in confidence and attitudes; increases in knowledge of fire fighting materials, equipments, and procedures; and demonstrated changes in skills and team performance. In addition, specific observations were made of the components (see figure 1. p. 12) of the overall training system.

SUBJECTS

Two teams of students were involved in the evaluation of the fire fighting training system using the Advanced Fire Fighting Team Training Course (J-495-0424) objectives as the basis for comparison. One team consisted of 15 subjects. The second team was composed of 16 subjects. Subjects assigned to each of the teams had varying experience in fire fighting and assignment to fire parties aboard ship. Neither team had performed as a unit prior to attending the Advanced Fire Fighting Team Training Course. However, these variations in the team composition do not weaken the findings of this study. They are perhaps in line with the reality that considerable differences in teams are expected at fire fighting schools and in the operating forces. A brief discussion of team differences in the present study are outlined below.

- Neither of the test teams was an intact unit.
- One team had only seven members fully qualified; the other team had a maximum of 10 fully qualified members.
- The teams did not match in terms of qualifications, experience, or training.

In addition to the 31 students undergoing the Advanced Fire Fighting Team Training Course, two additional groups of students were selected to respond to pre- and post-knowledge tests and pre- and post-training attitude questionnaires for the General Shipboard Fire Fighting Course (J-495-0412). This was done to obtain reliability data on these instruments. One group composed of 106 subjects responded to Forms A and D, Student Fire Fighting Questionnaire, and Forms B and C, General Shipboard Fire Fighting Course Pre-and Post-tests. The second group composed of 98 subjects responded to Forms H and K, Student Fire Fighting Questionnaire, and Forms I and J, General Shipboard Fire Fighting Course Pre- and Post-tests. These groups represented heterogenous samples of subjects reporting to the Fire Fighting School, FTC, Norfolk, for the course in General Shipboard Fire Fighting during 13-22 September 1982.

MATERIALS

Equipment and materials used in this evaluation consisted of the normal equipment and materials used in the General Shipboard Fire Fighting Course (J-495-0412) and the Advanced Fire Fighting Team Training Course (J-495-0424). A listing of these equipments and materials is provided in appendix A.

In addition to the standard equipment and materials used in the fire fighting courses, tests and questionnaires were developed to obtain data regarding team performance, individual skills and knowledge, and subject attitudes.

PERFORMANCE TESTING. To determine team performance prior and subsequent to undergoing the Advanced Fire Fighting Team Training Course (J-495-0424) a series of fires were attempted/extinguished by the subject teams. These fires were similar in class and type to the fires encountered in Device 19F1 but independent of the structure used and characteristically different training fires than provided by Device 19F1. This series of fires used existing structures and training facilities at the Fire Fighting School, FTC, Norfolk, which support the Fire Fighting Team Training Course (J-495-0418). Descriptions of the fires used for pre- and post-performance testing are presented in table 1.

KNOWLEDGE TESTING. Multiple choice tests were constructed for the General Shipboard Fire Fighting Course (J-495-0412). These tests consisted of 30 items each in alternate forms. Tests were designed to measure knowledge of each behavioral objective taught in the General Shipboard Fire Fighting Course; Forms B and I were used as pre-tests and Forms C and J were used as post-tests. Forms B and J were identical tests as were Forms C and I. The different form numbers were assigned to provide ease in the administration and scoring of tests. These knowledge tests for the General Shipboard Fire Fighting Course are shown in appendix B.

Forty multiple choice knowledge test items were constructed for the Advanced Fire Fighting Team Training Course (J-495-0424) by subject matter experts. Twenty items were selected for one test and the remaining items made up an alternate form of the test. In constructing alternate forms of the test care was taken to ensure each test contained equal numbers of true-false, three-item multiple choice, and four-item multiple choice questions. Forms E and L were used as pre-tests and Forms F and J were used as post-tests. Forms E and J were identical tests as were Forms L and F. The different form numbers were assigned to provide ease in the administration and scoring of tests. These knowledge tests for the Advanced Fire Fighting Team Training Course are shown in appendix C.

STUDENT ATTITUDE QUESTIONNAIRES. At different points during training in the General Shipboard Fire Fighting Course and the Advanced Fire Fighting Team Training Course, questionnaires were administered. The purpose was to obtain student responses concerning changing confidence levels, attitudes toward fire fighting training, and the desirability of being assigned to a fire party aboard ship. Items were constructed using a five point Likert scale

TABLE 1. PERFORMANCE TEST FIRES

TYPE	CLASS	DESCRIPTION
Mattress Fire	A	Presented in building structure referred to as "Hangar Deck," "Alpha Chamber" or "Smoke-filled Chamber." Fire consisted of smoldering, wet straw on a bunk in a highly dense smoke-filled atmosphere. The team had to penetrate two compartment doors, remove a simulated casualty, find and extinguish the fire.
Electrical Fire	C	Presented in building structure referred to as "Hangar Deck" "Alpha Chamber" or "Smoke-filled Chamber." Fire consisted of oil fueled fire on a piece of electrical equipment. Team was required to secure power (circuit breaker), find and extinguish the fire.
Oil Spray	B	Fire was presented on an open pad with oil lines. Team was required to secure oil valves and extinguish the fire using proper extinguishing agents and procedures.
Deep Fat Fryer	B	Fire was presented on an open pad with a simulated deep fat fryer (without hood). Team was required to extinguish the fire using proper extinguishing agents and proper procedures.
Bilge Fire	B	Fire was presented in an existing structure referred to as "Boiler Room." Structure was concrete with metal grating over the bilge. Fire was fueled by oil in the bilge. Team was required to enter passageway and make a "hot vertical door" entry into the space and extinguish the fire using proper extinguishing agents and procedures.

(Guilford, 1954). In addition to the items constructed using the Likert scale, a list of five objectives for fighting a fire was presented. These objectives were paired using all possible combinations in the manner recommended by Guilford. By using the method of paired comparisons, scalar values for each of the five objectives could be assessed, and through repeated measurements shifts in scalar values that might be attributable to training could be detected.

Student Fire Fighting Training Questionnaires Forms A and H are identical. Identical items appear on Forms D, G, K, and N. Forms D and K contain an additional 10 items for background and demographic variables. Forms K and N contain an additional set of items concerning useful aspects of training specific to the Advanced Fire Fighting Team Training Course. This set of items was constructed to determine scalar values of five attributes most helpful in the improvement of team performance. Items were arranged in the paired comparison method described earlier. Student attitude questionnaires used in the evaluation are shown in appendix D.

INSTRUCTOR QUESTIONNAIRE. An instructor questionnaire consisting of 38 items was constructed to elicit responses concerning Device 19F1 and the Advanced Fire Fighting Team Training Course (J-495-0424). Twenty-eight items used the Likert five point scaling technique. Ten items used the paired comparison method to obtain scalar values concerning important instructional characteristics of Device 19F1. The instructor questionnaire is shown in appendix E.

DEVICE 19F1 DATA PRINTER. A printer was used to obtain hardcopy records of Device 19F1 fire parameter values, exercise times, and air quality data. A sample data printout for a Deep Fat Fryer fire is shown in appendix F.

PERFORMANCE GRADE SHEETS. Instructors recorded student performance on grade sheets. A sample of which is shown in appendix G.

STOPWATCHES AND STOPCLOCKS. Stopwatches were used to measure times for performance testing. Information obtained from the Device 19F1 data printer as supplemented by stopwatches and stopclocks was used to obtain time information at significant points during the practice and graded exercises.

PROCEDURE

The 15 subjects assigned to the first test team along with 106 students assigned to the General Shipboard Fire Fighting Course were mustered prior to course commencement, and the Student Fire Fighting Training Questionnaire, Form A, and the General Shipboard Fire Fighting Pre-test, Form B, were administered. Subsequent to course completion, all students were assembled and administered the General Shipboard Fire Fighting Post-test, Form C, and the Student Fire Fighting Training Questionnaire, Form D. The following day, prior to instruction in the Advanced Fire Fighting Team Training Course, the 15 test subjects were assembled and administered the Advanced Fire Fighting Team Training Course Pre-test, Form E. Upon completion of the written knowledge test, subjects proceeded to the fire field at the Fire Fighting School, FTC, Norfolk, and were administered a performance test using the class and

types of fires described in table 1 of this section. The class and type of fire were presented in a random manner. Times and errors for each of the performance test fires were recorded. Knowledge and performance pre-testing was accomplished in approximately a 4-hour period. On completion of the pre-testing, subjects proceeded through training in the Advanced Fire Fighting Team Training Course.

The curriculum for the Advanced Fire Fighting Team Training Course provides for approximately 4 hours of classroom instruction prior to practice and graded performance exercises utilizing Device 19F1. The second day of training began with practice exercises in Device 19F1. Practice exercises in Device 19F1 consisted of a series of six fires. These fires included:

mattress fire (with casualty)
trash can fire (formerly rag bale fire)
electrical panel fire followed by a ruptured firemain
oil spray/bilge fire
storage compartment fire
deep fat fryer/hood fire.

Practice exercises were conducted without the use of simulated smoke and were not graded by course instructors. Times were recorded by the evaluation team, and student performance was observed at the fire scene by a member of the evaluation team. On completion of the practice exercises, the subjects began the graded exercises. The graded exercises included the same classes and types of fire as were presented in the practice exercises. Graded exercises did include the intervention of simulated smoke. Instructors completed grade sheets (see appendix G) for the team after each of the exercises. As in the practice fires, times were recorded, problems noted, and student performance was observed at the fire scene by a member of the evaluation team.

After the course was completed (middle of fourth training day), the team assembled on the fire field and taught the same classes and types of fires as were presented prior to course commencement. These performance test fires (see Table 1) were presented in a random manner. Times and errors were recorded for the performance test in the same manner as the previous performance test. On completion of performance testing, the team was administered the Advanced Fire Fighting Team Training Course Post-test, Form F, and the Student Fire Fighting Training Questionnaire, Form G.

The following week the team of 16 test subjects were mustered together with 98 students undergoing training in the General Shipboard Fire Fighting Course. Testing and procedures for this team were replicated in the manner previously described. The only difference that existed in the procedure was the counterbalancing of written knowledge tests to preclude order effects.

After both teams had completed training, instructor questionnaires were completed by the instructors and staff at the school who were qualified to teach the Advanced Fire Fighting Team Training Course and to operate Device 19F1.

ADEQUACY OF COMPONENTS IN PROVIDING TRAINING

PUBLICATIONS. Instructor/Operator Training Course Students' Guide, Vol. 1, is the primary document available to operators and maintenance personnel and is used as the operating manual by Fire Fighting School personnel. This manual was submitted to a readability test. Readability refers to the reading grade level of the "average" reader who should be able to understand the material. The Navy recognizes that technical manuals are often difficult to read and use, and that many Navy enlisted personnel experience difficulty in reading. The Department of Defense (DOD) has established a criterion for determining the readability of materials designed for use in training and maintenance functions in order that the training materials may be more useful to its intended user. This criterion is included in MIL-M-38784A, Amendment 6, 21 December 1981.

Determining Readability. Selected samples of material from the manual were analyzed to determine readability. Sample selection used the following procedure. The number of pages are counted to determine the total length of written text, in this case 43 pages. This number is then divided by the number established by the sampling table contained in MIL-M-38784A (in this case 8) to determine the appropriate minimum number of samples. Thus five (43 divided by 8) are needed to evaluate the text.

Procedure. Manual samples were chosen by randomly selecting a page, marking it, and then counting to every eighth subsequent page until six samples were identified (more than required). The words in each sample were counted up to the end of the sentence containing the 200th word. A minimum 200-word sample is required, but the sample must end with a complete sentence. Thus, some samples were slightly longer then needed.

The sample paragraphs were keyed into the Computer Readability Editing System (CRES) (Kincaid, Aagard, and O'Hara, 1980) for analysis. This system accepts narrative material, evaluates it for readability, and provides suggested editorial changes to reduce the readability grade level. The CRES is currently used by many Navy commands, among which are: the Strategic Systems Project Office; Naval Ship Weapon Systems Engineering Station, Port Hueneme, California; Navy Underwater System Center; and CNET. It is anticipated that most features of the CRES will become part of the Naval Technical Information Presentation System (NTIPS) when the NAVMAT system comes on line in the mid-1980s.

The CRES analysis counts the number of syllables, words, and sentences within the text. A mathematical formula, the Flesch-Kincaid formula (MIL-M-38784A, Amendment 6, 21 December 1981), is applied. The resulting number is the reading grade level for the "average" reader. Uncommon words (i.e. not on the merged list formed from the American Institute for Research List, the Bureau of Naval Personnel Verb List, the Army Familiar Word List, the National Cash Register (NCR) Fundamental English Word List, the Basic English Word List, and the Basic Navy Word List) are flagged and listed as part of the process. Editorial suggestions are made for editors or writers who wish to use them.

An analysis of each sample was obtained and then a summary analysis of the entire sample was made. The samples and the CRES summary analysis are included in appendix H.

DEVICE 19F1 DATA. Data on device 19F1 were collected in two ways, direct observation and computer printout of the exercise information processed.

Direct Observation. A member of the evaluation team observed all fires at the scene. Thus the realism of the environment and the fire as well as the effect of agent application was observed. A second team member remained with the instructor at the console. In this way it was possible to observe problems and their solutions, how the instructor interacted with the fire team, and the extent to which instructors used their readouts. Times, not available on the printout, were taken with a stopwatch. After each fire the TEE team met and discussed the fire, readouts, and actions of each of the parties involved to ensure a complete picture was obtained. All post-fire debriefings were observed.

Since the contractor had total responsibility for the maintenance of the device, no relevant observations concerning maintenance could be made. However, the Preventative Maintenance System (PMS) cards were examined to identify the number of pre- and post-fire maintenance hours required on a daily basis and on a weekly basis.

Computer Printout. After each exercise, whether practice or graded, a computer printout was obtained of the fire parameters, exercise data, and air quality. An analysis of computer data and instructor observations was made to establish areas of strength and weakness, and how each of these subcomponents affected overall training. In addition, the information was compared to the MC to ensure all training requirements were met.

STRUCTURE. The physical requirements of the structure are specified in the MC. Observations of the actual structure (excluding sensor placement) were made and compared with the MC. An analysis of the findings led to a determination of the strengths and weaknesses of this component of the system as it supported training.

SUPPORT SUBSYSTEM DATA. No training OBA had been developed, therefore, no examination was appropriate.

During the observation of the individual fires, smoke, environment, extinguishing agents, and safety were noted. In addition, the computer printout, discussed previously, included air quality measures and equipment malfunction indications. Subsequent analysis of the printed information in conjunction with direct observations permitted the drawing of valid conclusions with respect to the effect of the support subsystems on training.

CURRICULUM. The training objectives established by the Fire Fighting School were accepted as valid since the Fleet Project Team approved the MC and the training objectives expressed therein. The curriculum for course J-495-0424 was designed to use Device 19F1 as placed in the training structure. The curriculum was examined solely from the relationship of students to the training structure as it exists; no modifications to the curriculum were made during the TEE.

SECTION IV

RESULTS AND CONCLUSIONS

This section lists the major findings of the study. The findings are divided into those based on the total training program and those which affect training based on the components which comprise the system (see table 1, p. 24). The results of this study were derived from data and observations obtained using an approved curriculum, regular instructors at the Fire Fighting School, and student teams randomly drawn from operational units. Student teams are representative of "normal" or "average" students undergoing training.

TRAINING PROGRAM TEE

A comprehensive evaluation of the training program was made using a vantage point of three perspectives: trainees, instructors, and operational personnel not directly involved in the training program. Various issues were examined from each vantage point to obtain an accurate picture of the entire training program. The results and conclusions on each issue are presented under each perspective.

TRAINEE REACTION. Three major training objectives were examined to obtain some measure of the effectiveness of the training program. These were: (1) changes in team performance and skills attributable to training, (2) changes in attitudes that might be due to the training program, and (3) changes in knowledges or cognitive skills that may have occurred as a result of training. Each of these three objectives are examined in detail in the subsequent paragraphs.

Team Performance and Skills. Team performance was assessed by measuring times required to complete five criterion fires ignited in existing structures at the Fire Fighting School, Norfolk. The times were recorded from the initial alarm (General Quarters) until the fire party was secured from the exercise. For all fires 14 minutes had been set by the Fire Fighting School as a criterion of successfully extinguishing the fire. Times greater than 14 minutes would most likely result in critical damage or personnel injuries that would negate further attempts by the team to control the fire. In other words, the fire would essentially be out of control at that point. The figures and text concerning team performance times are arranged by type of fire; i.e., Class B, Class C, and Class A. This arrangement is a better illustration of the overall training benefits by class of fire.

Class B Fires. Three Class B fires were presented. These were a bilge fire, an oil spray fire, and a deep fat fryer fire. Figure 6 shows the change in performance exhibited by both teams in coping with the bilge fire before and after training. Initially both teams were unable to extinguish the fire within the 14 minute criterion measure. This exercise was discontinued for both teams after a period of 24 minutes because the extinguishment of the bilge fire by either team was doubtful. After training both teams extinguished the bilge fire in considerably less time than the criterion.

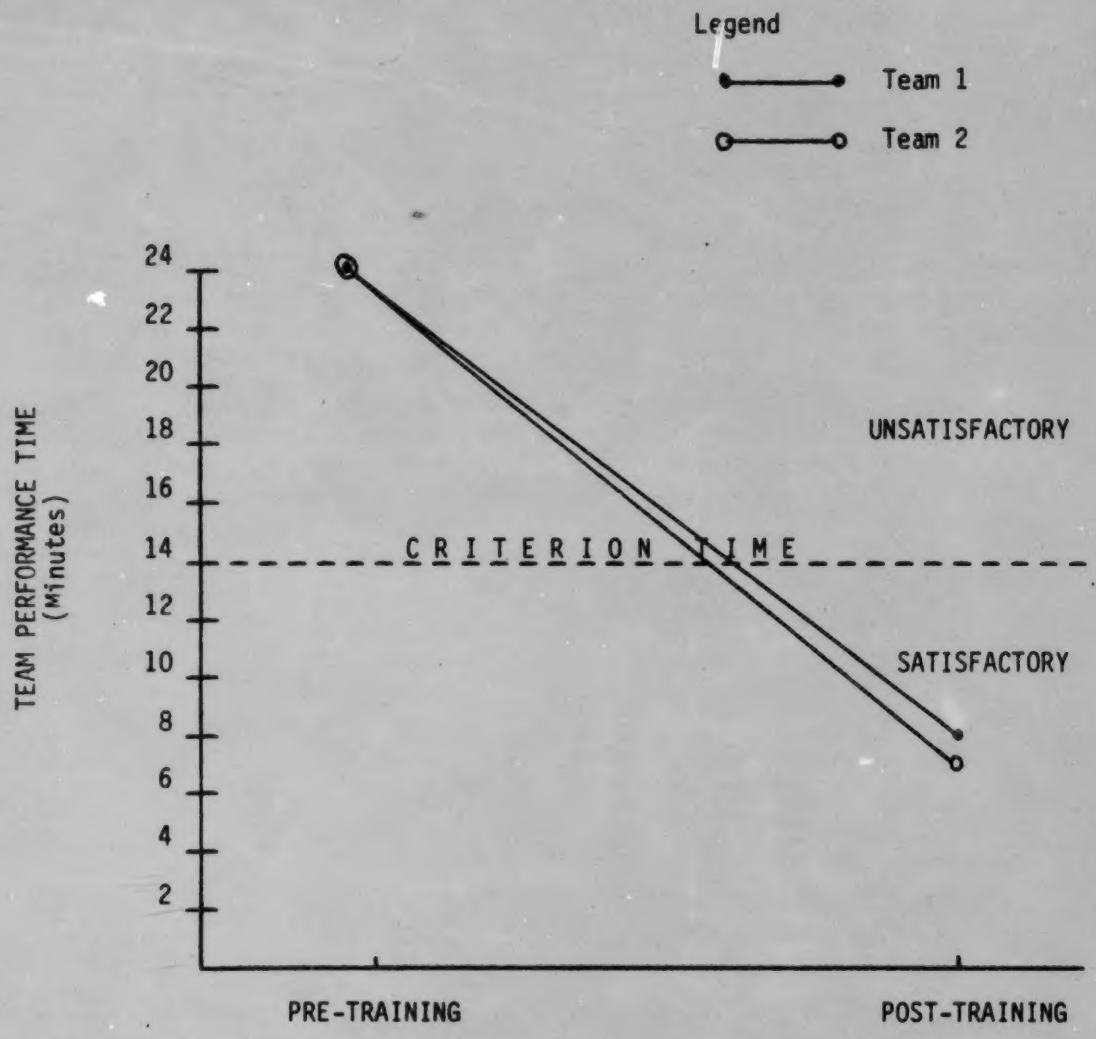

Figure 6. Pre- and Post-Training Time Measures for Two Teams Extinguishing Bilge Fires

Figure 7 illustrates team performance before and after training in controlling an oil spray fire. Initially team 1 was unable to control the fire within criterion time and the exercise was terminated at 24 minutes. This was the result of the team's failure to shut off the fuel source which resulted in a continuous reflash of the fire. Team 2 did meet the criterion time measure before training, however, they showed an obvious performance improvement after training.

Figure 8 graphically presents the two teams' efforts in controlling the deep fat fryer fire. Both teams extinguished the fire well under criterion measures for both the pre- and post-training exercises. It is worthy to note, however, that this fire was unrealistic. The deep fat fryer was positioned on an open pad and easily located and identified. In the pre-training exercises both teams committed more procedural errors than on the post-training exercises. For instance, team 2 applied the extinguishing agent, CO_2, improperly; i.e., too close to the fire. This caused the burning oil and grease to be literally blown out of the deep fat fryer. It is highly probable that other fires and/or personnel injuries would have occurred had the deep fat fryer been located in an enclosed space as it is aboard ship.

Team performance of both teams was significantly improved after the training course.

Class C Fires. Both teams exhibited improved performance in controlling the Class C (electrical) fire after training. Figure 9 presents the pre- and post-training time measures for the two teams in extinguishing the electrical fire. Team 1 performed unsatisfactorily (24 minutes) on the pre-training exercise without a successful extinguishment before the drill was secured. This was due to the team's failure to secure power; a situation which would have resulted in all members of the team being disabled by electrical shock. An obvious improvement is shown for team 1 on the post-training exercise. Team 2 was able to meet criterion requirements on the pre-training exercise, however, they also exhibited marked improvement on the post-training exercise.

The course and Device 19F1 contributed significantly to the teams' ability to successfully cope with Class C fires.

Class A Fires. As shown in figure 10, performance of both teams was unsatisfactory on both the pre- and post-training exercises. However several important points should be considered in addition to the time measures recorded. The Class A fire was a simulated mattress fire and included a simulated casualty. The exercise required the team to penetrate smoke filled watertight compartments, locate and remove the simulated casualty, and locate and extinguish the fire. On the pre-training exercise, both teams failed to penetrate the second watertight compartment in the time of 24 minutes.

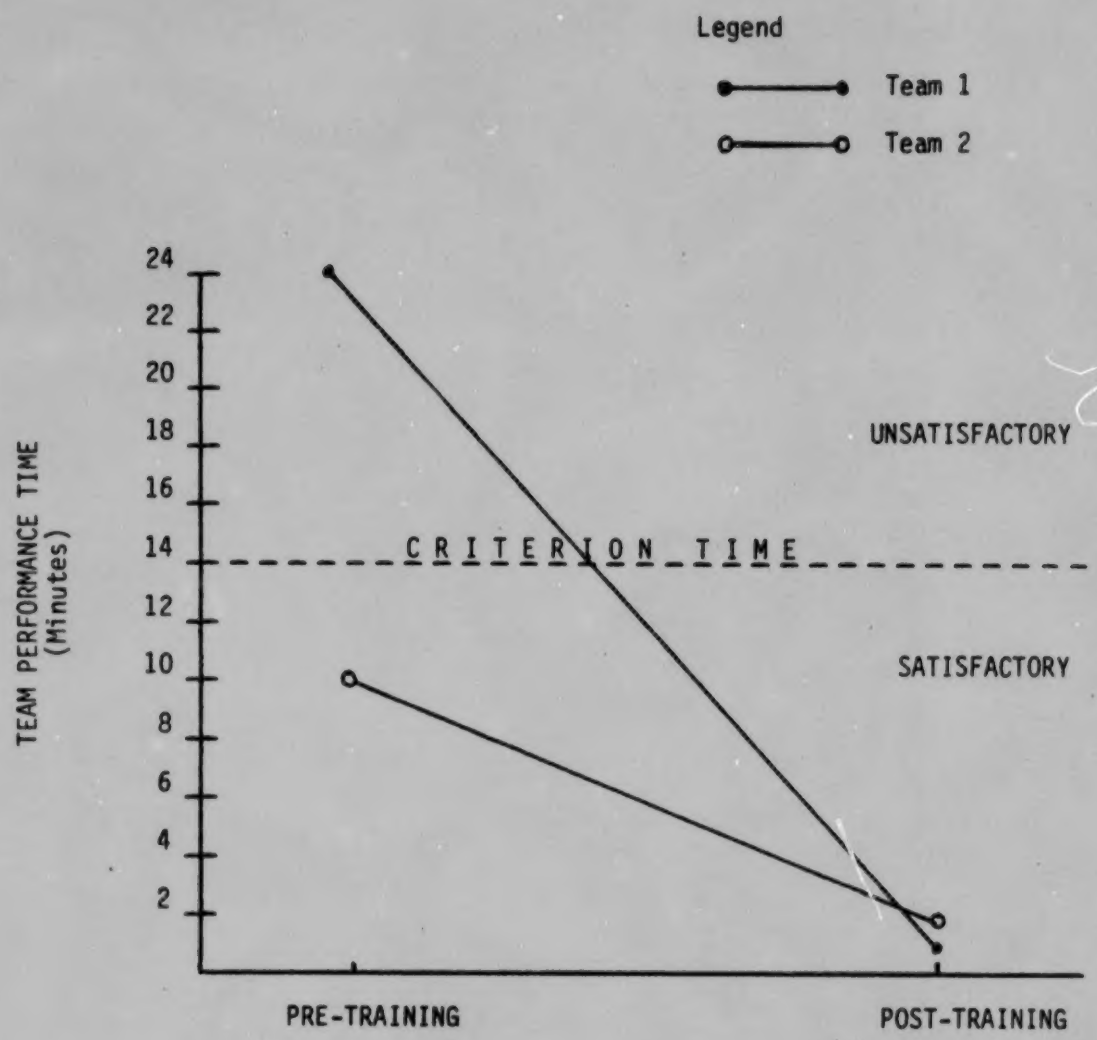

Figure 7. Pre- and Post-Training Time Measures for Two Teams Extinguishing Oil Spray Fires

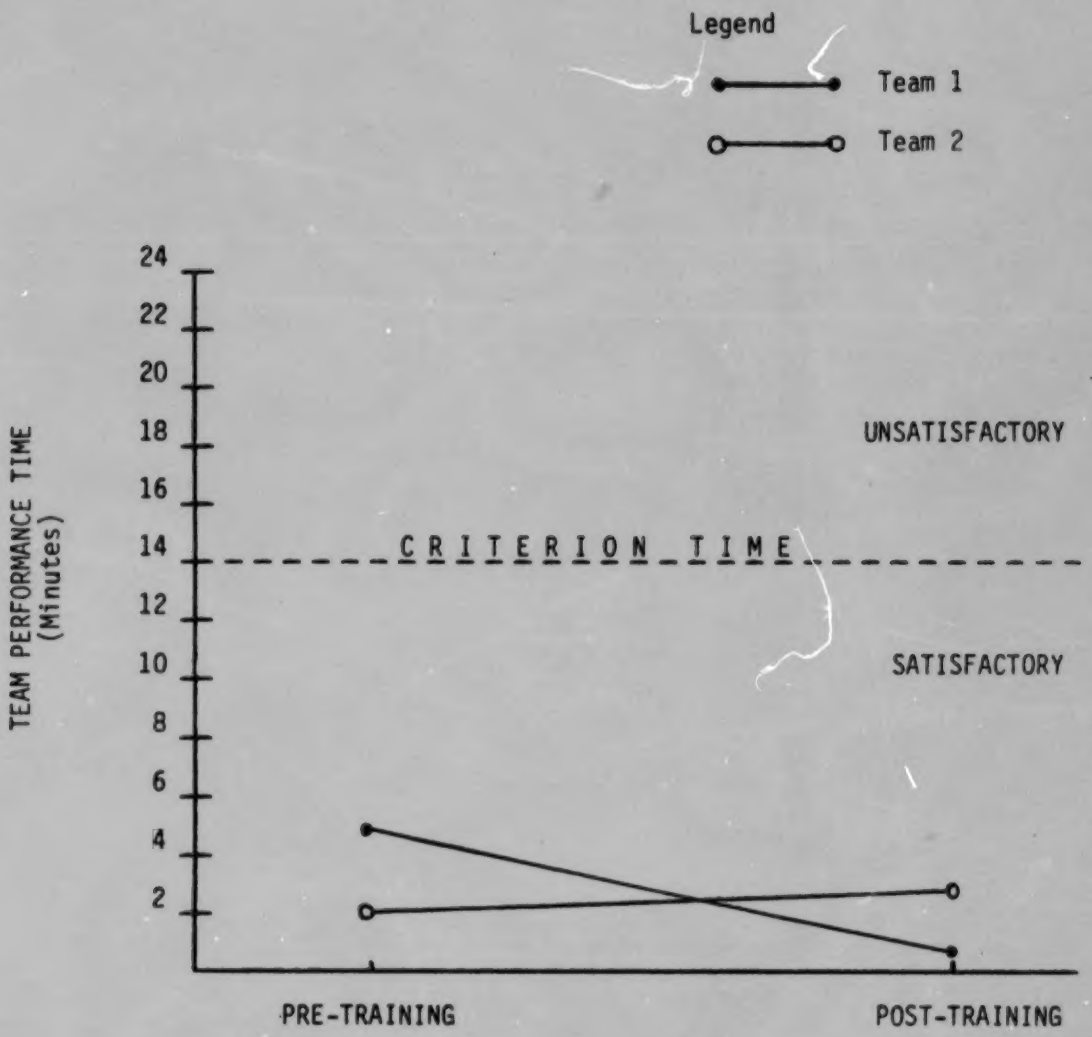

Figure 8. Pre- and Post-Training Time Measures for Two Teams Extinguishing Deep Fat Fryer Fires

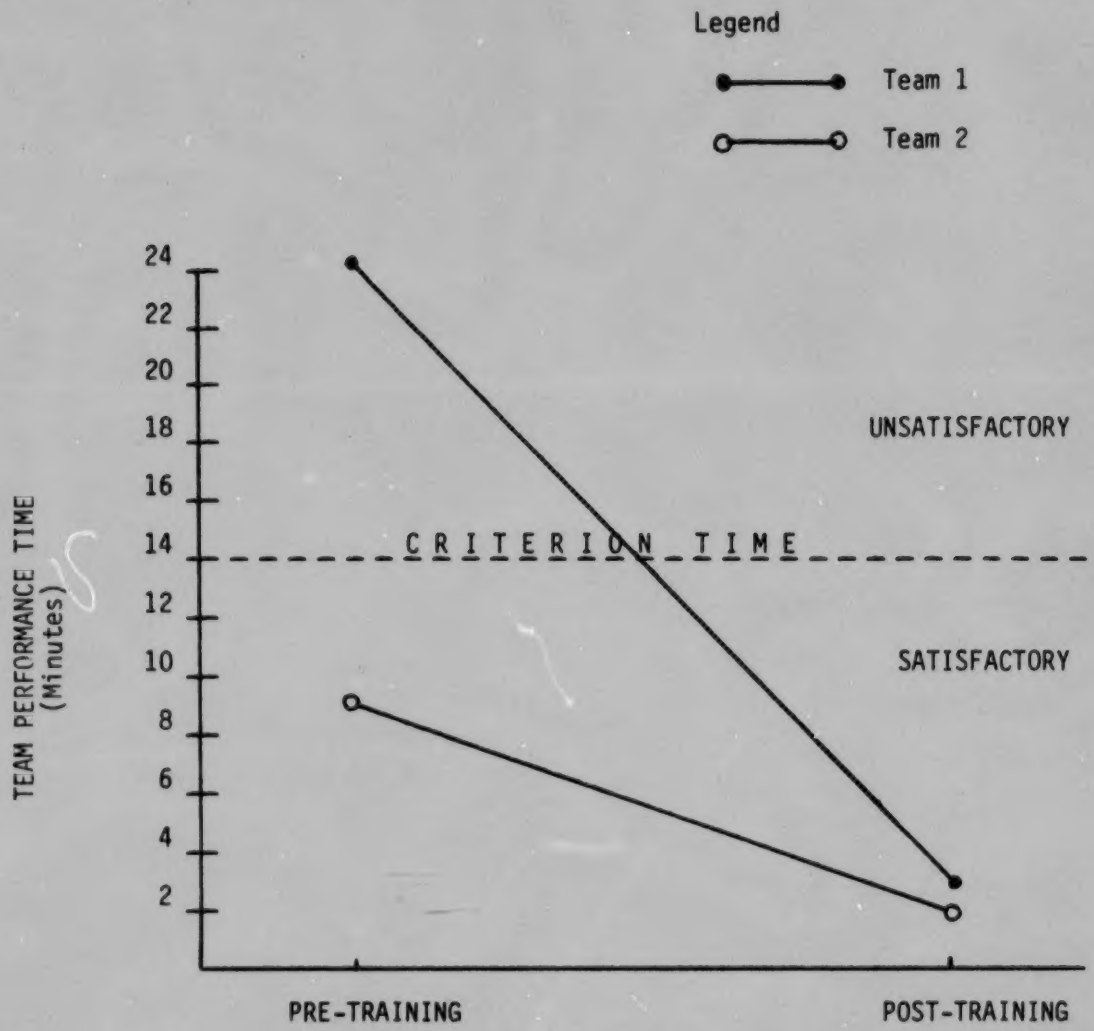

Figure 9. Pre- and Post-Training Time Measures for Two Teams Extinguishing Electrical Fires

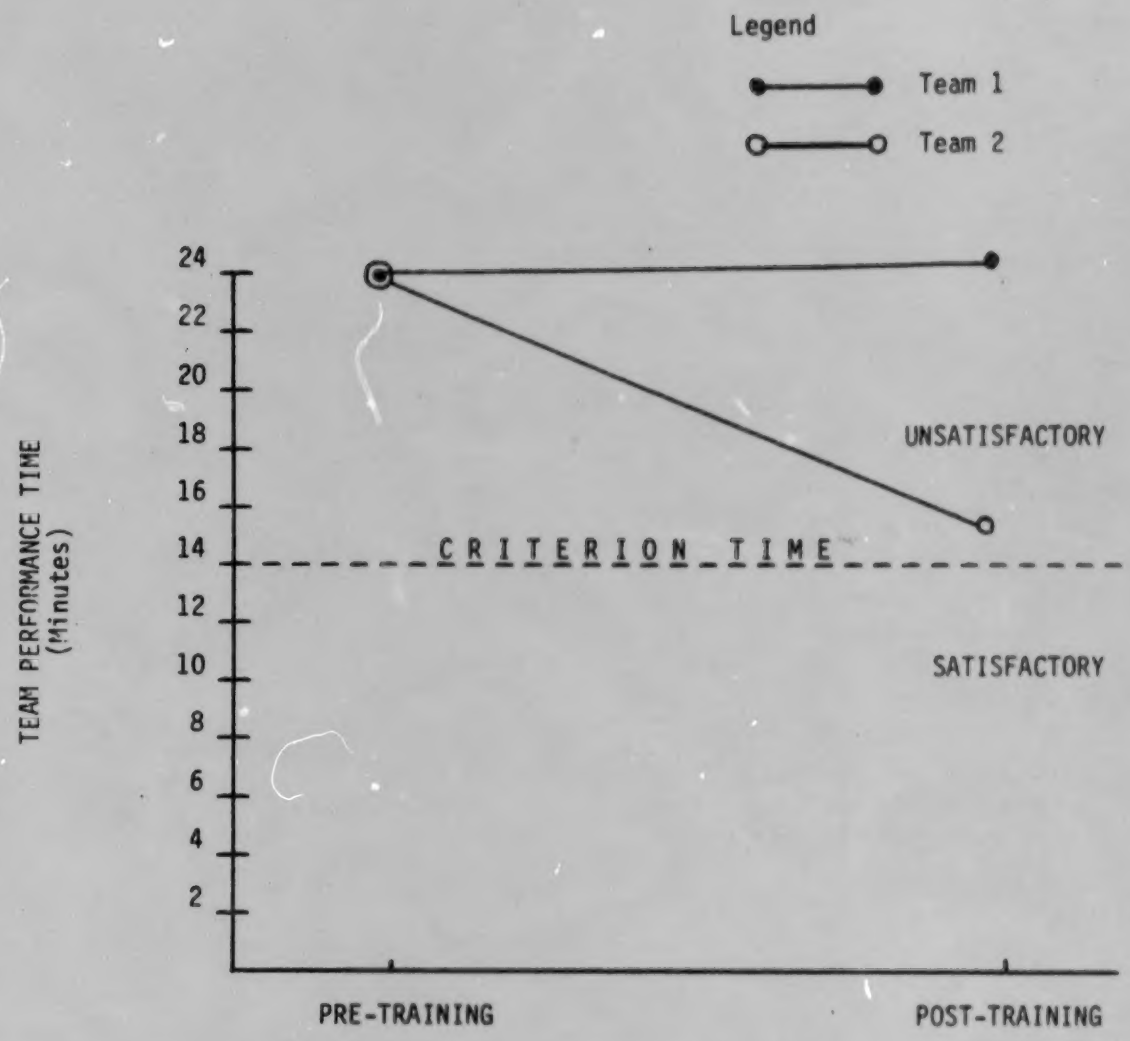

Figure 10. Pre- and Post-Training Time Measures for Two Teams Extinguishing Mattress Fires

Neither the casualty nor the fire was located. During the post- training exercise both teams penetrated the second compartment and removed the casualty within 7 minutes. This was considered acceptable and satisfactory. Both teams had difficulty in locating the actual source of the fire. One reason for this difficulty was the dense smoke filled environment which caused a lack of oxygen; the fire extinguished itself. The reason for unsatisfactory performance on the post-training fire was the result of inadequate simulation rather than team performance. It was also noted that during training between the two criterion fires in Device 19F1, the simulated smoke was not contained in the structure. The members of both teams had considerably more visibility during training than was encountered in the criterion fires. This is discussed in greater detail subsequently.

The effectiveness of the training course and Device 19F1 did not appear to be as effective for Class A fires as for Class B or C fires. However, significant procedural improvements were noted for both teams in coping with Class A fires.

Attitudes of Individual Team Members. Attitudes of individual team members were assessed across three dimensions directly related to fire fighting and fire fighting training. The first dealt with the confidence of the individual in his knowledge and ability to cope with and contribute to successfully controlling a fire aboard ship. The second dimension encompassed the beneficiality of fire fighting training and fire fighting duties as perceived by the individual. The third dealt with the desirability of fire fighting training and assignment to fire fighting duties aboard ship.

These dimensions were probed at three points during fire fighting training. First attitudes were assessed prior to beginning the General Shipboard Fire Fighting Course (J-495-0412). Intermediate measures were taken upon completion of Course J-495-0412 and prior to beginning the Advanced Fire Fighting Team Training Course (J-495-0424). A final measure was taken upon completion of course J-495-0424.

In addition to the three dimensions of confidence, beneficiality, and desirability, individuals ranked five objectives of fire fighting in general as viewed from that student's personal view. The intent of this analysis was to determine if training caused a shift in perceived priorities concerning fire fighting objectives. These objectives were presented as comprehensive paired comparisons at the same three previously discussed points in the training program.

Finally the student was presented five training attributes for course J-495-0424 upon course completion. A ranking of these attributes was assessed by using the paired comparison method.

Confidence. Analysis of items comprising the "Confidence" scale revealed the scale to be highly reliable (Reliability coefficient, Alpha=.914). This high reliability indicates that individuals respond consistently and interpret the scale in a similar manner.

Table 2 presents the results of an analysis of variance (ANOVA) to determine any differences in scale values for confidence at the three measurement points. Results of the ANOVA reveal significant differences across time concerning the students' perceived confidence at the different measurement points.

TABLE 2. RESULTS OF ANOVA FOR CONFIDENCE SCALE VALUES AT THREE DIFFERENT TIMES

SOURCE	SS	df	MS	F
Between People	2784.22	26	107.09	
Within People	1488.67	54	27.57	
Between Measures (Confidence Values Over Time)	748.74	2	374.37	26.31*
Residual	739.93	52	14.23	

*$p < .05$

Figure 11 graphically shows the change in scale values for confidence at each of the three measurement points. Confidence scale values were higher after the J-495-0412 course and the J-495-0424 course than the measurement obtained before training. These differences were significant at the .05 level of confidence indicating a reliable change in perceived confidence. Results reveal that changes in the scale values from pre- to post-training in course J-495-0424 were not significant. This may be attributable to a "ceiling effect" in the measurement scale. In other words, the considerable increase in confidence at the second measurement point effectively reduced the range of scale values.

It is worthy of note that, over the entire training program, considerable increases were made concerning the individuals' perceived confidence in fire fighting capabilities. This is a major objective of the training program.

Beneficiality. Analysis of items comprising the "Beneficiality" scale also revealed the scale to be highly reliable (Reliability coefficient, Alpha=.898). Table 3 presents the results of an ANOVA to determine any differences in scale values for beneficiality at the three measurement points.

Results indicate that there were no statistically reliable differences across the three measurement points concerning the students' perception about fire fighting duty assignment and training as being beneficial to

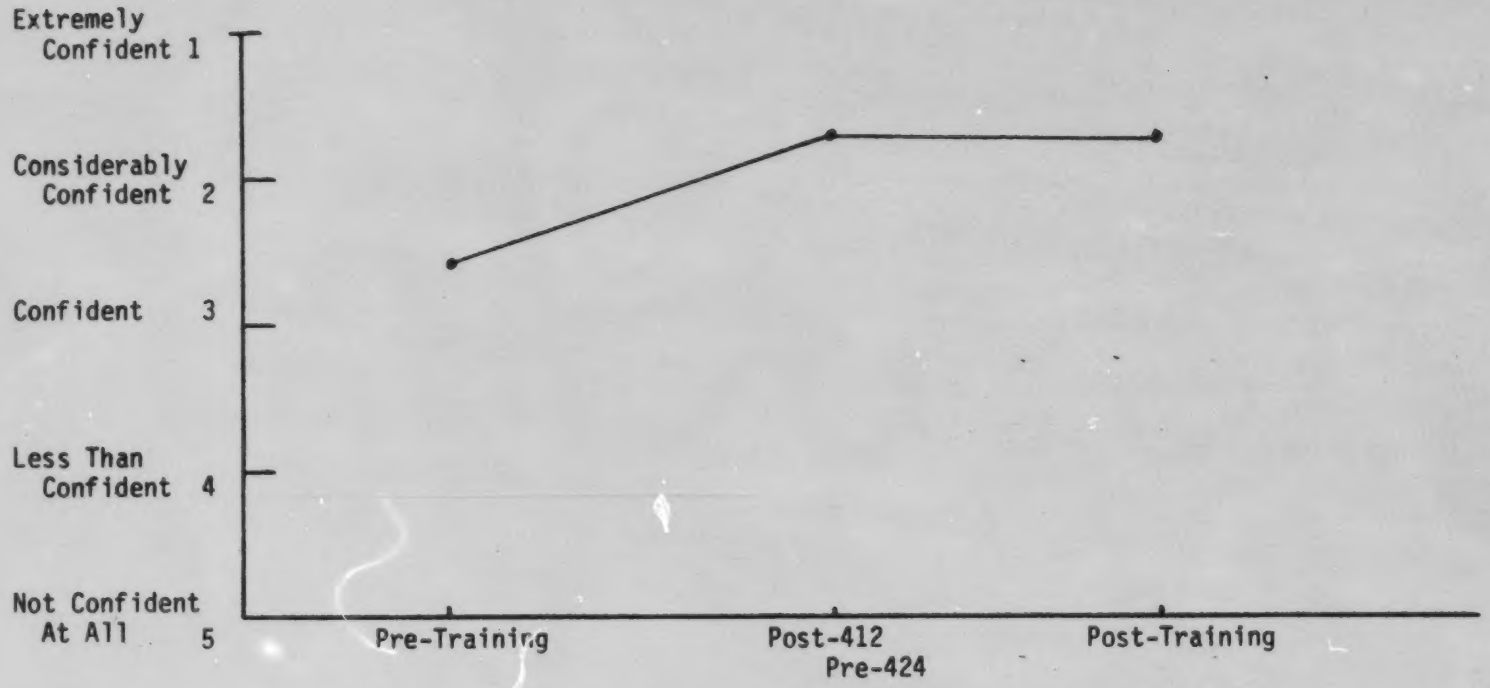

Figure 11. Confidence Scale Values at Three Measurement Points

their career. Figure 12 shows the mean scale values at each measurement point with regards to beneficiality of fire fighting duty assignments and training. There appears to be a slight upward trend; however, since no statistical significance was found, it would be tenuous to infer this trend is reliable.

TABLE 3. RESULTS OF ANOVA FOR BENEFICIALITY SCALE VALUES AT THREE DIFFERENT TIMES

SOURCE	SS	df	MS	F
Between People	2075.56	26	79.83	
Within People	1958.67	54	36.27	
Between Measures (Beneficality Values Over Time)	122.30	2	61.15	1.73 NS
Residual	1836.37	52	35.31	

NS = Not Significant

Desirability. Analysis of items comprising the "Desirability" scale shows the scale to be reliable (Reliability Coefficient, Alpha=.788). Table 4 presents the results of an ANOVA for the desirability scale as measured at three different points in training.

TABLE 4. RESULTS OF ANOVA FOR DESIRABILITY SCALE VALUES AT THREE DIFFERENT TIMES

SOURCE	SS	df	MS	F
Between People	176.22	26	6.78	
Within People	124.00	54	2.30	
Between Measures (Desirability Values Over Time)	9.85	2	4.93	2.24 NS
Residual	114.15	52	2.20	

NS = Not Significant

As indicated by the ANOVA there were no significant differences across time concerning the students perception of the desirability of a fire fighting duty assignment or fire fighting training. Figure 13 shows the students' mean response at the three time periods in training on the desirability scale. There were no significant differences in scale values across time, therefore, any differences in scale values may be attributed to chance alone.

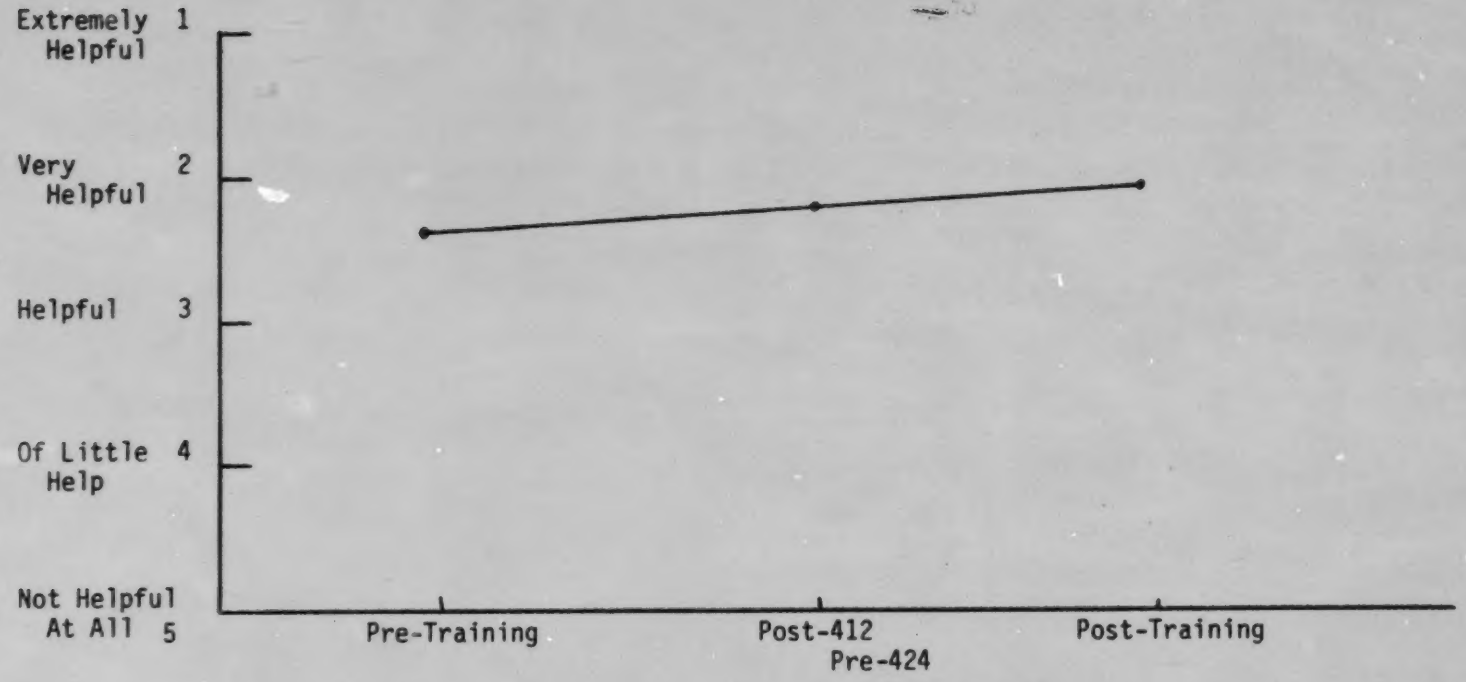

Figure 12. Beneficiality Scale Values at Three Measurement Points

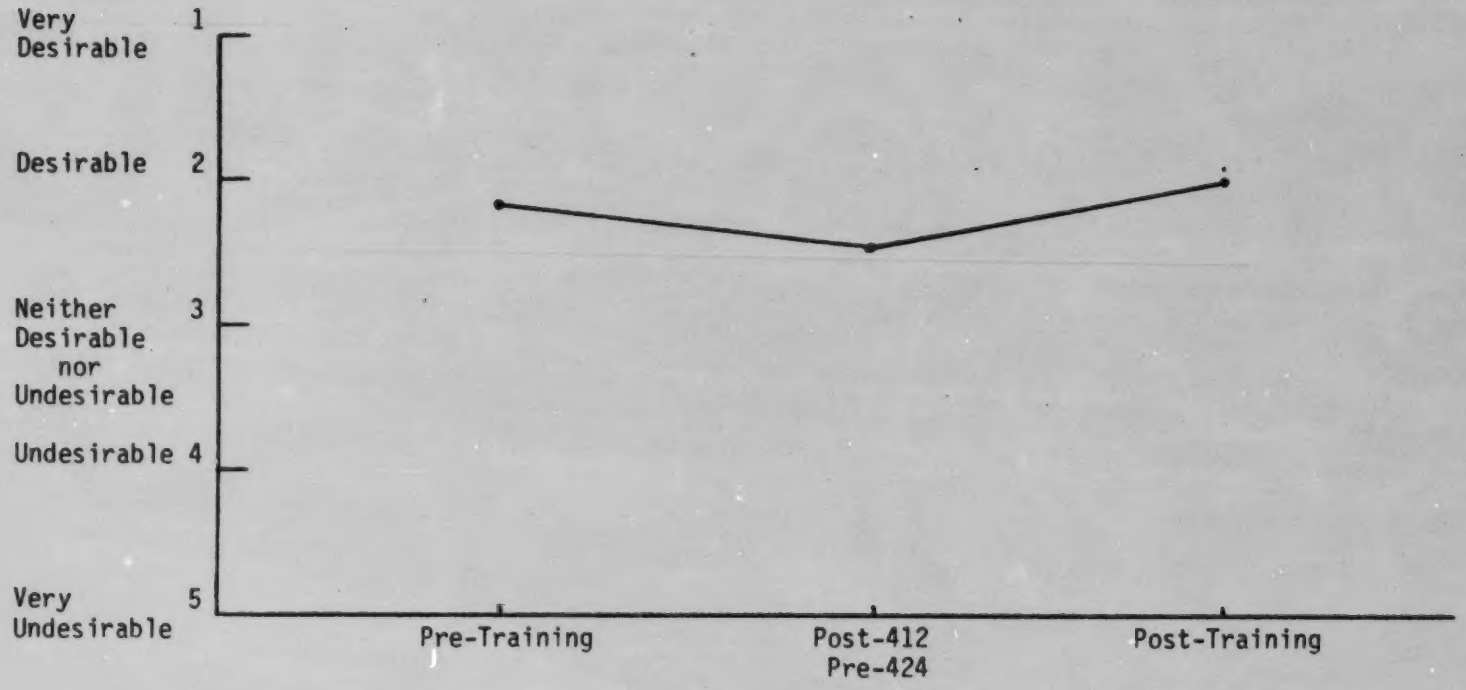

Figure 13. Desirability Scale Values at Three Measurement Points

Perceptions of Fire Fighting Training Objectives Results of the paired comparison analysis for five fire fighting objectives are presented in table 5.

TABLE 5. PERCEIVED IMPORTANCE OF FIRE FIGHTING OBJECTIVES AT THREE TIMES DURING TRAINING

OBJECTIVE	TIME 1 (Pre-Training)	TIME 2 (Post-412, Pre-424)	TIME 3 (Post-Training)
Contain/Extinguish the Fire	.6185	.5870	.4077
Protect Myself from Personal Injury	.4185	.4740	.5615
Protect Others in Fire Party from Injury	.4630	.4826	.5308
Remove/Provide Injured Personnel with Medical Assistance	.4778	.4130	.6692
Prevent Further Damage to the Ship	.5222	.5435	.3308

The figures in table 5 represent the proportion of time each objective is selected over all other objectives by the individuals who comprised the two teams who underwent training. Table 5 indicates that perceived importance changed considerably as training progressed. Three objectives showed a constant trend. The objective "Contain/Extinguish the Fire" decreased in perceived importance over the period of training. This is consistent with the Fire Fighting School's apparent philosophy to deemphasize the fire as the most powerful focal point of fire fighting efforts. That is, if proper procedures, correct methods, and attention to other objectives are accomplished the fire will be contained and extinguished as a routine matter. The objectives of "Protect Myself from Personal Injury" and "Protect Others in the Fire Party from Injury" showed a steady increase in perceived importance. Again this agrees with the tenants of the Fire Fighting School which emphasizes that injuries to personnel directly involved in fire fighting efforts could have catastrophic consequences to the overall fire fighting objectives. Two objectives appeared to reverse trends during training. "Remove/Provide Injured Personnel with Medical Assistance" decreased in importance after the J-495-0412 course, then reversed the trend to become the most important objective after course J-495-0424. Conversely, "Prevent Further Damage to the Ship" increased in importance after the J-495-0412 course, then decreased to become the least important objective after training course completion. A possible explanation of these trend reversals

could be an inconsistency between the emphasis the two courses (J-495-0412 and J-495-0424) place on these fire fighting objectives. An explanation follows.

During the General Shipboard Fire Fighting Course, students are taught that personnel casualties are attended to after the fire is controlled. During the fire, the time taken to attend to casualties may result in damage to the entire ship and crew. This also explains the rise in perceived importance of the objective "Prevent Further Damage to the Ship." However, the J-495-0424 course emphasizes that, during peacetime, protection of personnel is of ultimate importance. During wartime, students are told, material protection may be the major objective of fire fighting efforts. The fire fighting objectives after training, apparently, are perceived concomitant with a peacetime environment and are emphasized during training of course J-495-0424.

Order of the Most Helpful Attributes of the Advanced Fire Fighting Team Training Course. The rank order of how well the Advanced Fire Fighting Team Training Course met five training attributes was determined by the paired comparison method and is presented in table 6.

TABLE 6. RANK ORDER OF TRAINING ATTRIBUTES AS PERCEIVED BY STUDENTS

ATTRIBUTE	RANK	PROPORTION OF TIMES ATTRIBUTE SELECTED OVER ALL OTHERS
Team Work	1	.7077
Cross Training	2	.6385
Use of Equipment	3	.5923
Learn Individual Duties	4	.4385
Training Unnecessary	5	.1231

Students perceived that experience gained in working as a team is the most valuable attribute of the training course. The higher rankings given to teamwork, cross training, and the use of equipment corresponds to the training objectives of this course. The lowest ranking given to the concept that this training was unnecessary suggests a valid reason for this course.

Knowledge. The training regime presented to individual members of the teams was assessed to determine gains in cognitive skills through written pre- and post-knowledge tests. Pre- and post-knowledge tests were administered before beginning and after completing course J-495-0412 and again after course J-495-0424.

A significant improvement was shown by both groups after completion of the General Shipboard Fire Fighting Course. The mean raw score for the pre-test was 16.93 (total raw score = 30), while the mean raw score for the post-test was 21.07, with an average gain of 4.14. Differences between pre- and post-test scores were determined to be reliable (t=6.93, 26df) at the .05 level of confidence.

Instruction in the J-495-0412 course considerably improved the individual's knowledge concerning fire fighting. Since students undergoing training in the evaluation were currently assigned to a fire fighting party aboard ship and had some previous training in fire fighting, the gains in knowledge achieved by the J-495-0412 course are even more significant. In effect the time spent in the J-495-0412 course is not wasted; rather it provides needed valuable refresher training.

Course J-495-0424 is not designed to incorporate paper and pencil testing of knowledges gained in the course. Rather the course is designed to provide practical exercises in team fire fighting training. For purposes of the TEE, a knowledge test was constructed. Team members did not exhibit significant gains in knowledge based on the test results. The post-test scores were slightly lower than pre-test scores ($\bar{X}$=15.04 vs 15.25). Lower post-test scores were not significantly different (t=-.051, 27df) at the .05 level of confidence. This indicates that differences in pre- and post-test scores may be due to chance alone. Reliability of the test was determined by the Kuder-Richardson (KR-20) formula. The KR-20 revealed very low reliability for the instrument (r=.36). It is not possible to determine if the low gain scale score is due to few cognitive skills taught in the J-495-0424 course or simply a poorly constructed instrument that is incapable of providing a reliable measure of these cognitive skills.

The combined changes in team performance, individual attitudes, and fire fighting skills and knowledges show favorable trends as a result of training. Anecdotal information supplied by students during the evaluation lends support to this trend. Device 19F1 provides adequate support to the training program.

INSTRUCTOR REACTION. Six instructors who had had practical experience on Device 19F1 at the Fire Fighting School, Norfolk, were asked to respond to a questionnaire designed to assess three characteristics of the device. These characteristics were: (1) realism of Device 19F1 when compared to an actual fire, (2) the ease or difficulty that the simulated fires could be extinguished in comparison to an actual shipboard fire, and (3) the instructional features of Device 19F1. Finally, instructors were asked to respond to five statements that dealt with training benefits that might be realized from Device 19F1.

Realism. Instructors responded to a Likert scale which ranged from 1 as representative of a highly realistic situation in which there are no differences between the training situation and an actual fire, to 5 as a very unrealistic situation that would bear little resemblance to an actual fire. The overall mean rating of Device 19F1 was 2.19 indicating the device was realistic with minor differences between the training situation and an

actual fire. Features that were rated as most realistic were simulated extinguishing agents, reaction of the fire to the extinguishing agents, repair locker equipment, and the proper placement of fire fighting equipment in the trainer. Features that were rated as having questionable realism to unrealistic were torching of the fire and simulated smoke.

Difficulty. Difficulty was assessed using a Likert scale which ranged from 1 as very easy in that the training situation provides environment, materials, and/or equipment that would not be available in an actual fire, to 5 as very difficult in that the training situation imposed conditions that are probably worse than an actual fire. The overall mean rating by the instructors was 2.75 indicating a neutral rating which is defined as the training situation being very much the same as an actual fire. The item that received a response as being easier than other items was Orienting and Forming the Fire Party. This is understandable since the fire party was intact at the time of the General Quarters alarm and did not have to assemble and form from scattered individual watch (work center) station assignments.

Instructional Features. Instructional features were assessed on a Likert scale which ranged from 1 as excellent denoting features were optimal and could not be improved, to 5 as unacceptable indicating features are such that improper or inadequate design cannot be overcome even with considerable effort. The overall mean rating was 2.35 indicating a rating between adequate (3) and good (2). Items rated as the best instructional features were: Provides Students with Problems of Increasing Difficulty (rating of 1.5) and Provides Adequate Safeguards for Students and Instructors (rating of 1.7). Items receiving the lowest ratings were: Facilities to Brief, Debrief and Critique Students (rating of 3.0) and Observation of Student Performance (rating of 3.2).

Training Benefits of Device 19F1. Table 7 presents the rank order of the instructors' opinions about how Device 19F1 supports the training program. Safety and use as an Instructional Aid shared the top rank of training benefits selected by instructors. Rankings also indicate Device 19F1 is perceived to afford more benefit than present methods of instruction which do not use Device 19F1. Device 19F1 is well received as a vehicle to provide more effective instruction at the fire fighting school.

OPERATIONAL ASSESSMENT. To determine if training received had a positive effect, a questionnaire was sent to the respective ship of each team. Ships' officers and other members that had an opportunity to observe team performance after training were asked to comment regarding team performance and value of the training to the ship. Only one of the two ships responded to the follow-up questionnaire; however, comments indicate a noticeable improvement in team performance and a high regard for training received during the TEE. A major recommendation of the reply is that all fire fighting teams, both in port and underway, attend course J-495-0424.

TABLE 7. RANK ORDER OF TRAINING BENEFITS OF DEVICE 19F1 AS PERCEIVED BY INSTRUCTORS

TRAINING BENEFIT	RANK	PROPORTION OF TIME BENEFIT SELECTED OVER ALL OTHER BENEFITS
Safety for Students and Instructors	1.5	.7000
Instructional Aid Supporting Classroom Instruction	1.5	.7000
Provides Realistic Shipboard Environment	3	.4667
Provides Realistic Fires	4	.4333
Little or No Benefit	5	.2000

COMPONENTS EFFECT ON TRAINING

Each of the five components of the training system was examined independently of the total system, as well as within the system. The five components, publications, Device 19F1, structure, support subsystem, and curriculum, are addressed in detail in the following paragraphs.

PUBLICATION. Analysis of the Instructor/Operator Student Guide, Vol. 1, resulted in a readability level in excess of 13.5. This means that the publication was prepared for the college level reader. The text is extremely complex and presented in long sentences that are difficult to comprehend; this increases the readability level significantly. The vocabulary used is not difficult, nor are the number of uncommon words excessive. It is the format that is responsible for the high readability level.

CRES Analysis. In addition to determining the readability level, the CRES analysis procedure has other features which provide a significant amount of descriptive information about the text. These features of the CRES analysis are included to help the author/editor produce the type of text suitable to the user and are related to the readability analysis. A brief description of each feature, its use, and the relationship to the analysis follows. These features are illustrated in appendix H which is a selected part of each of two analyzed samples.

1. Uncommon words are flagged in the analysis. These are words not found on technical word lists previously identified nor on a supplemental

engineering word list which was developed and applied in this analysis. Uncommon words are identified in the sample by square brackets. Once a word has been identified, the author/editor must make a subjective judgment as to whether or not to use the word, substitute a more common word, or define it for the reader. The number of uncommon words flagged in this sample are not excessive and are not a significant factor in the high readability level obtained.

2. Long sentences, which contain more than 22 words, comprise more than one-fourth of the sentences examined. The longer a sentence, the harder it is for the reader to understand. As a rule, long wordy sentences result in a higher readability level. Both of the examples have wordy sentences that are difficult to comprehend.

3. Passive voice is the use of a verb composed of the auxiliary verb "to be" plus a past participle. Passive voice increases the number of words in a sentence and thus increases the readability level. In addition, language experts agree that the active verb is easier to understand.

4. Awkward words and phrases are flagged because they are usually difficult to comprehend. Often these words and phrases contain a pronoun referent that is unclear or may be confusing; for example, "there is" and "it will be."

Appendix I contains the restructured sample sentences shown as examples in appendix H. The suggested changes are the result of the CRES analysis. The restructured samples are clear, more concise statements that should be more easily understood by the reader. The readability of the examples in appendix I has been reduced below the 10th grade reading level.

DEVICE 19F1. A printout of the parameters established for each fire, exercise data, and air quality data was obtained. These data, accompanied by appropriate remarks concerning various fires, are summarized in table 8. Results of the data analysis are discussed next. The air quality data analysis will be discussed under the Support Subsystems.

Controls. Four controls on the fire are preset by the instructor. The interaction of these controls establishes the difficulty of extinguishment, the appearance, and the heat generated.

1. Instructional procedure is to reduce the fire from burn to pilot after the investigators have located the emergency, and return to burn as the fire party approaches. Compartment heat build-up in these circumstances is minimal, an irrelevant condition for some fires. However, other fires, such as the machinery space fire, require high heat for realism. One machinery space fire was conducted without reducing the burners to pilot, and the heat build-up was such that it was not possible to stand, or squat, in front of the fireplace.

2. The control parameters as established appeared to have little effect on the extinguishment in a significant number of fires. For example, the team #2 graded fire for the trash can had, as a control, a minimum

extinguishment time of 10 seconds. Although the actual application of water was for 8 seconds, the fire was extinguished.

3. A number of parameters were zero (see table 8) yet the fire developed as planned and reacted correctly to applied agents. There is probably an error in the program which controls the fires.

4. Soak time does not appear to operate properly at all times and may not affect the extinguishment of a fire. In one fire, the mattress fire, the requirement for soak with a solid stream of water has been eliminated since this action is no longer needed. Team #1 practice storage compartment fire controls indicated a required soak of 10 seconds and an actual soak of 0 seconds; even so the fire was extinguished. Both team #2 storage compartment fires required a reduction of soak time from 10 seconds to 5 and 2, respectively, before the fires could be extinguished even though proper procedures were followed.

Sensors.

1. The CO_2 sensor on the electrical panel is activated by released smoke. This forces the instructors to use little or no smoke with this fire.

2. One machinery space fire could not be extinguished even though AFFF was correctly applied. The agent sensor did not function. One trash can fire could not be extinguished because the agent sensor did not function. One deep fat fryer/hood fire gave indications of the application of water prior to the arrival of the fire fighting team; the sensor gave improper indications.

Fires.

1. In general, the fires were sufficiently realistic that they did not detract from the training. Minor differences of opinion existed among subject matter experts with respect to the mattress fire and the electric panel fire concerning flame characteristics.

2. At this time, maintenance is performed by contractor personnel. However, at a subsequent time the Fire Fighting School may be required to assume this responsibility, and future trainers may be maintained by Naval personnel. An examination of the PMS Cards used by the contractor was made. This resulted in a determination that daily required checks of the system take 3 hours and 59 minutes of which 2 hours and 7 minutes are post-operational checks. In addition to the daily checks, 3 hours and 52 minutes per week are required to be spent conducting weekly checks. All daily pre-operational checks require 2 people; 4 of the 6 post-operation checks require the presence of a second person.

To conduct an 8-hour burn day requires the presence of maintenance technicians for a minimum of 12 hours; double shifting may be required.

TABLE 8. TRAINING DATA SUMMARY

TEAM	EXERCISE	PARAMETERS: GROWTH SEC	PARAMETERS: SPREAD SEC	PARAMETERS: SOAK SEC	PARAMETERS: MINIMUM EXTINGUISH SEC	PARAMETERS: TOTAL EXERCISE SEC	EXERCISE DATA: PILOT SEC	EXERCISE DATA: BURN SEC	EXERCISE DATA: AGENTS APPLIED TEAM	EXERCISE DATA: AGENTS APPLIED TYPE	EXERCISE DATA: APPLICATION SEC	EXERCISE DATA: SOAK SEC	EXERCISE DATA: ELECTRICITY OFF YES/NO	EXERCISE DATA: OIL SECURED YES/NO	EXERCISE DATA: HOOD DAMPER CLOSED YES/NO	EXERCISE DATA: SMOKE SEC	EXERCISE DATA: DEBRIEF MIN	AIR QUALITY: O_2 MIN %	AIR QUALITY: CO MAX %	AIR QUALITY: CO MAX %	AIR QUALITY: ALARM ACTIVATED TYPE	REMARKS
1	MATTRESS																					
	PRACTICE	0	0	5	10	663	332	663	H_2O	78	8	NA	NA	NA	0	80'	21.7	1.3	1.3		HARDWARE MALFUNCTION. NONE OCCURRED
	GRADED	0	0	5	10	745	171	696*	H_2O	27	0	NA	NA	NA	340	27	FAILED	7.8	1.7		HARDWARE MALFUNCTION. NONE OCCURRED
2	PRACTICE	0	0	5	10	527	2	0	H_2O	UNK	UNK	NA	NA	NA	190	7	20.0	5.5	1.4		
	GRADED	0	0	5	10	554	66	482	H_2O	8	8	NA	NA	NA	200	20	19.5	9.5	1.3		
1	TRASH CAN																				
	PRACTICE	40	NA	5	7	363	175	63	H_2O	0	8	NA	NA	NA	0	18	19.3	4.9	2.3		SOAK SENSOR INOPERATIVE
	GRADED	40	NA	5	7	690	2	0	H_2O	0	0	NA	NA	NA	85	42	23.5	10.2	1.9		EMERGENCY STOP - NO REASON. PRINT-OUT ONLY
2	PRACTICE	10	NA	5	10	425	17	386	690	H_2O	12	UNK	NA	NA	NA	0	13	19.5	11.2	2.4	FIRE NOT EXTINGUISHED. AGENT
	GRADED	10	NA	5	5	522	82	186	270*	H_2O	13	0	NA	NA	NA	186	5	19.0	12.7	4.8	TIME SHORT. SEVERE PROBLEM
1	STORAGE																				
	PRACTICE	10	0	10	0	508	419	410	375	H_2O	218	0	NA	NA	NA	0	4'	18.7	9.5	1.3	
	GRADED	10	0	10	0	1252	606	560	923*	H_2O	187	10	NA	NA	NA	235	25	19.0	15.1	1.0	EMERGENCY STOP - NO REASON. PRINT - OUT ONLY
2	PRACTICE	10	0	10-4[6]	0	633	693	488	605	H_2O	182	33	NA	NA	NA	0	2'	19.4	12.3	1.3	CO
	GRADED	10	0	10-4[6]	0	703	798	602	735	H_2O	395	23	NA	NA	NA	150	0'	18.9	12.6	1.8	HARDWARE SMOKE GEN. PROBLEMS
1	ELECTRICAL																				
	PRACTICE	NA	NA	NA	10	786	69	152	736	CO_2	10	NA	YES	NA	NA	0	14	20.1	.8	1.2	O, AND CO. READINGS SUSPECT
	GRADED	NA	NA	NA	10	830	64	186	695	CO_2	10	NA	YES	NA	NA	75	3'	FAILED	.8	1.0	TEAM TIME FIRE ONLY 222 SEC.
2	PRACTICE	NA	NA	NA	20	841	10	313	841	CO_2	24	NA	YES	NA	NA	0	11	20.4	1.0	1.0	TEAM TIME FIRE ONLY 324 SEC
	GRADED	NA	NA	NA	20	871	18	506	525	CO_2	53	NA	YES	NA	NA	180	12	20.2	2.1	1.2	TEAM TIME FIRE ONLY 265 SEC. LIGHT SMOKE. GENERATOR MALFUNCTION
1	DEEP FATHOOD																				
	PRACTICE	0	5/0	NA		507	53	306	353	PKP/H$_2$O	2/10 8	NA	YES	NA	YES	PRINTER FAILED	33	←PRINTER FAILURE→			
	GRADED	0	5/0	NA	NONE/10	657	17	350	388	PKP/H$_2$O	4/12	NA	YES	NA	YES	185	23	23.5	9.8	1.6	EMERGENCY STOP - NO REASON. PRINT OUT ONLY
2	PRACTICE	0	5/0	NA	NONE/10	341	91	215	356	PKP/H$_2$O	4/7[1]	NA	YES	NA	YES	45	0'	19.5	7.8	1.1	H$_2$O SENSOR ACTIVATED PRIOR TO APPLICATION. SMOKE INDICATED. NONE
	GRADED	0	5/0	NA	NONE/10	210	40	39	178	PKP/H$_2$O	4/3[1]	NA	YES	NA	YES	60	5	19.0	10.8	4.1	H$_2$O SENSOR ACTIVATED PRIOR TO APPLICATION
1	OIL SPRAY/BILGE																				
	PRACTICE	10	7	NA	5	467	5	53	440	H_2O/ AFFF/PKP	0/4/0	NA	NA	YES	NA	60	26	9.8	13.2	1.2	HARDWARE MALFUNCTION. 2 TEAM MEMBERS MISSING
	GRADED	10	7	NA	10	914	199	398	581	H_2O/ AFFF	2/55	NA	NA	YES	NA	121	0'	19.3	7.8	.7	PRINT SAID BILGE ONLY. PROPANE SHUT DOWN
2	PRACTICE	10	5	NA	10	1506	27	1434	1683	H_2O/ AFFF	11/4/4	NA	NA	YES	NA	140	19	19.7	8.8	1.5	PRINT SAID BILGE ONLY. REASON. PRINT ONLY
	GRADED	10	5	NA	10	661	9	161	548	H_2O/ AFFF	3/17	NA	NA	YES	NA	121	15	19.6	9.8	1.1	EMERG STOP - NO TIME DUE TO LACK OF OBR CANS. HARDWARE MALFUNCTION. ACTUAL RUN SYAS PKP APPLIED. NOT USED

1. HC AND NO_x SENSORS INOPERATIVE, HEAT SENSOR BY PASSED
2. FOLLOWED IMMEDIATELY BY RUPTURED FIREMAIN. ONE EXERCISE
3. FIRE WOULD NOT EXTINGUISH. PROCEDURE CORRECT. SOAK TIME REDUCED
4. INCLUDED SIMULATED PERSONNEL CASUALTY
5. INSTRUCTOR SECURED FIRE. NOT RERUN
6. DEBRIEF INCLUDED RESTOW AND EQUIPMENT INSPECTION
7. FOLLOWED IMMEDIATELY BY BREAK

STRUCTURE. For purposes of this report the structure includes the building, installed lighting, building ventilation, and the propane system.

Building. The existing building is not adequate; it is physically too small and many of the installed fittings do not correspond, or even approach those found aboard ship. Specific observations are incorporated in the following paragraphs.

1. Hatch and scuttle operation gives the teams a false impression of the means to descend to a lower deck.

2. Fire is reflected beneath the floor grating and is visible from adjacent compartments. In one instance the investigating team confused the reflection and reported a fire in the incorrect compartment.

3. The red power-on lights are installed above the door leading from each compartment to the outside. Although these lights are very bright and distracting, they are necessary for safety reasons.

4. The machinery space is entered through a watertight (WT) door from an adjoining compartment on the same level. For reasons of safety, no vertical approach to the compartment is possible in the existing structure.

5. There is no facility within the structure for dewatering. There are facilities elsewhere at the Fire Fighting School to instruct in the mechanics of dewatering (pump/eductor operation).

6. The original structure contained no facilities for a ruptured firemain exercise. Personnel at the Fire Fighting School have installed a simulated firemain which ruptures. This exercise is conducted in conjunction with, but subsequent to, the extinguishment of a fire but is an independent exercise.

7. Section III C.1.b. of the MC establishes as one of its goals the following:

> The training building is designed to accommodate one complete fire exposure/extinguishment evolution every 20 minutes per side of the structure. Four teams may be scheduled simultaneously, two teams engaged in an exercise and two teams receiving a critique and preparing for the next lesson. Six team experiences can be scheduled every hour.

This goal cannot be met even when both sides of the trainer are operative, primarily because there is not adequate space on the roof for more than one team at a time.

8. No capability exists for a "hot door" determination by investigators. This is simulated by instructors stating the entrance to the machinery space is a hot door.

9. The MC includes, in the definition of technical specialist, the DCA and his assistant. The existing building does not contain adequate facilities or communications to incorporate training of these specialists.

10. The remote shut-off valve for the oil spray/bilge fire is on the second deck, not the damage control deck.

11. The deep fat fryer is installed in a simulated range with a simulated Gaylord Hood. There is no Range Guard System as would generally be found aboard ship.

Lighting. Installed lighting does not include compartment lighting and battle lanterns as are found aboard ship, nor is such an installation simulated. There are installed battery-operated lanterns which are above head height and operate exclusively on battery.

Ventilation.

1. Ventilation is controlled by an exhaust fan system on the roof. This four fan system is used exclusively to ensure adequate fresh air is available to trainees and to evacuate the building of undesirable elements. There is no installed shipboard type ventilation system upon which to exercise the fire fighting teams.

2. Design of the structure is such that there is a continuous updraft through the building. This condition is exacerbated when the rooftop hatch or scuttle is open. Unless smoke is generated on an almost continuous basis, it is not possible to provide adequate obscuration of the lower deck (machinery and berthing spaces). The first deck, galley space, and mess deck are more efficient, but not fully satisfactory.

Natural air flow, particularly on windy days, prevents the smoke from remaining in the lower deck compartments. When the roof hatch and scuttle are closed, there is an apparent down draft which pulls smoke from these compartments through the base of the building.

Propane System. There are two blocking valves which, when closed, shut off propane to the building. Located between these valves in a line approximately 18 inches long is a bleed valve to prevent pressure build-up. This valve bleeds only the 18 inch segment; there is no bleed valve to remove propane from the lines in the building. In addition, this bleed valve vents at the building beneath the lower deck.

SUPPORT SUBSYSTEMS. The supporting subsystems are smoke, the Oxygen Breathing Apparatus (OBA), the environment, extinguishing agents, and safety.

Smoke. The general problems associated with the retention of smoke was discussed previously. This section will be confined to observations directly related to the smoke and smoke generating equipment.

1. The Navy Environmental Health Center stated that the choice of smoke substitute is satisfactory.[2] The TEE evaluator at the fire scene wore a filter mask and no eye covering. The artificial smoke did cause coughing and eye irritation. Discussion with instructors elicited the fact that this phenomenon occurred with most of them, but they appeared to develop a tolerance for the environment. Fire team personnel wearing activated OBAs had no problems; however, some team members not wearing OBAs, standing at the open hatch when billows of smoke escaped, did complain of minor discomfort.

2. Real electrical fires exude large quantities of smoke. The simulated electric panel fire does not produce an adequate quantity of smoke for either realism or obscuration. Investigation revealed that the quantity of smoke was restricted because back pressure in the line leading to the smoke generator caused the smoke generator to cut out.

3. Smoke problems with the electric panel fire have been discussed. In addition, 2 of the remaining 10 fires wherein smoke was used evidenced problems. Discussions with instructors elicited the information that this smoke problem; i.e., lack of or inadequate quantities of smoke, emanated from the smoke generator.

4. Smoke is grey in all instances. This smoke color is not consistent with all types of fire.

Although smoke color may be inconsistent, it is considered acceptable for training for the following reasons:

- The smoke, when properly used, does obscure. It is possible to reduce visibility to less than 2 feet. The primary purpose of the smoke is to reduce visibility.
- Compartments are dark. Within a given compartment it is difficult to distinguish the color of the smoke. It is doubtful that investigators could use the color of the smoke as a clue to the type of fire.
- In view of the comments above, the expenditure of funds to develop vari-colored smoke consistent with each type fire and the means to control this smoke may not be warranted.

OBA.

1. Actual OBAs with live canisters are used. Training equipment has not been developed. Cost of training will remain high until a training OBA is developed.

2. Investigators wear the OBA, but do not use a tending line. This is a required enabling objective specified in the MC.

[2]CO, Navy Environmental Health Center letter 43:EMG:sc 1500 Ser 09011 dated 2 September 1981.

Environment. The environment within the structure is monitored and the results displayed on the Beckman unit in the instructor's station and on the instructor's console. Faults in this system affect safety, therefore, this aspect of the environment will be discussed under safety.

Subject matter experts expressed a desire for solid decking and for higher humidity at the fire scene. Solid decking replicates an actual shipboard environment in most instances, and high humidity conditions exist at a shipboard fire scene.

An examination of these two factors as they might affect training was made. Solid decking would likely increase the heat buildup in a compartment, but this can be better controlled through the use of extended burn times. There is a possibility that solid decking would increase building maintenance and increase the difficulty of extinguishing agent disposal. More important then either of the above, it is unlikely that solid decking would affect training. Gratings, as they exist, do not impede nor help trainees. Exact replication of ship's compartments does not necessarily enhance achievement of training objectives.

Humidity at the fire scene, ashore or afloat, is a function of the liquid present in the specific compartment and the heat available to vaporize the liquid. Until fire fighters actually arrive on the scene and attack a fire with a liquid, the humidity in most compartments, ashore or afloat, should not be excessive. Within the structure at the Fire Fighting School this situation is duplicated, for high humidity and steam occur only when a liquid is applied to the fire.

Given the above, it is concluded no action on these items is required.

Extinguishing Agents. The extinguishing agents functioned in a satisfactory manner.

Safety (see MIL-STD-882 series). Providing all operating instructions are correctly followed, and all personnel entering the structure wear the recommended respiratory gear and eye protecting device, the training structure is considered relatively safe for students and instructors, and equipment damage is unlikely. However, the following factors could affect safety unless the most rigid precautions are followed at all times.

1. Communication affects training effectiveness and safety. Communications are discussed in this section because the safety of personnel and equipment is a prime consideration during all training evolutions.

Communications between the fire scene instructor and the instructor's console is by means of sound powered (SP) telephone. Use of the SP system requires the instructor to be in a relatively fixed position. Should he leave that position, the telephone cord is stretched across the compartment similar to a trip wire. When corrective action is taken by the on-scene instructor, or when he must perform a function not in the immediate fire scene, two-way communications with the instructor's console are broken. In the simulated machinery space communications are by hand-held SP telephone.

This prevents movement from a fixed spot. Should it be necessary to contact the on-scene instructor when he is not at the fixed position, a call bell or the general announcing system is used.

Communication between instructor and student is by shouting. During a normal drill, the noise level is already very high; therefore, instructor-student communications are restricted. It was noted that the on-scene instructor usually removes his respiratory protection to speak to the student. During these instances, two-way communication with the instructor at the console is lost.

The general announcing system is a one-way system. In addition, during exercises the noise level on scene is such that comprehension is extremely difficult even if the announcement is heard.

2. There is a strong possibility that the roof area will be unsafe during the winter months in its present configuration. Trainees become soaked during the fire fighting evolutions. The wind chill factor at the Fire Fighting School on the roof of the 3-story building could preclude the use of this area for assembly and debriefing. In addition, there is a possibility that the water on the metal grating will freeze and raise additional safety considerations. Lastly, there is no installed system to prevent water in the pipes and hoses from freezing.

3. A propane by-pass line can be opened to by-pass the blocking valves. There is no indicator, either locally or at the instructor's console, to alert personnel when the by-pass is open.

4. Extraneous material such as angle iron, pipe, and other building materials are stored in the structure. Trainees, particularly investigators, could fall over this material.

5. Some pipe hangers strung to the deck grating have not had the screws cut off at deck level.

6. The Beckman air quality monitoring system is not reliable, is not visible to the instructor during operation of the console, alarms in a spurious manner, and was not calibrated during the period of TEE. In addition, many of the recorded readings, particularly of O_2, are suspect. Two sensors, HC and NO_x, were inoperative during the entire TEE.

7. Propane piping runs predominantly beneath the structure. The propane bleed valve exhausts close by the structure. There are no propane sensors beneath the structure. Since propane is heavier than air, a specific gravity of 1.5 to 1.6 compared to air (1.0), a propane leak could cause a pocket of propane to form under the building, thereby creating a potential for an explosion.

8. Propane storage is underground and within 50 feet of the structure. The storage tank is vented to the atmosphere. In addition,

there is a pressure relief valve vented to the atmosphere. In the past the pressure relief valve has lifted. Parking is permitted adjacent to the storage tank.

9. Temperature sensors are located only in the exhaust vents. Even these have been by-passed because they have, on occasion, shut the trainer down, and instructors at the scene of the fire have stated temperatures within the training area are not excessive.

CURRICULUM. The curriculum for course J-495-0424 is designed around the structure and device as it exists, not as described in the MC. The curriculum is excellent. This is particularly notable since the TEE was the first application of course J-495-0424 to a group of trainees, and there was insufficient time prior to the TEE for instructors to practice training techniques on the Device 19F1. The following comments should be considered when the curriculum is reviewed.

Investigators. The Fire Fighting School has developed a unit of instruction on the proper procedures to be followed by the investigators. The unit was developed at the Fire Fighting School and is the first of its type. This is a critical unit in that a correct investigation prevents injury, saves time, and ensures the appropriate equipment is brought to the scene.

Criterion Time. A single criterion time for extinguishment of all fires has been established.

Fire Parameters. Fire parameters were constant for the majority of practice and graded fires. The only difference was the injection of smoke for graded fires.

Observers/Instructors. Three instructors control and observe all exercises, one at the instructor's console, one on the roof, and one at the fire scene. All actions taken during exercises cannot be observed from these three stations.

Student Perception. Discussions with members of both test teams were held with respect to their perception of their degree of readiness for course J-495-0424. The consensus was that they were prepared, but only because they attended course J-495-0412 immediately preceding the advanced course. Without the refresher course much of the team training time would have been lost to individual instruction. This is supported by the student responses to questionnaires.

SECTION V

RECOMMENDATIONS

The Device 19F1, Advanced Fire Fighting Simulator (Surface), is a practical training device which provides effective training to organized shipboard damage control and fire fighting teams. It is recommended that CNET proceed with the acquisition of follow-on training devices based on the principles of the Device 19F1 as instructional aids to support the curriculum.

Specific recommendations concerning the training effectiveness of the training system are presented below. These are followed by recommendations which apply to the supporting components which affect the effectiveness of the training system.

TRAINING EFFECTIVENESS

1. Performance tests of the teams given prior to team training indicate either a low state of team readiness to successfully fight shipboard fires, or unrealistic criterion test measures. It is beyond the scope of this TEE to determine either or both, yet the issue of operational units manned by effective fire fighting teams is fundamental to the safety of the Fleet and warrants further investigation.

2. The training installation at the Fire Fighting School, FTC, Norfolk, requires a modified structure or structure replacement capable of supporting the prospective training requirements.

3. Subsequent acquisitions of Device 19F(series) should be planned to ensure the structure is adequate in size and design at each proposed site to meet projected training requirements.

4. One day refresher training, based on course J-495-0412, is required immediately prior to course J-495-0424 to ensure individual fire fighting competency.

5. Relevant objectives for fire fighting training applicable in both peacetime and wartime environments should be established and consistently applied to all courses.

6. Teams undergoing the Advanced Fire Fighting Team Training Course should be accompanied by a damage control or repair officer to ensure all team members and decision makers are trained to follow identical techniques.

7. More emphasis should be placed on the investigator duties especially under reduced visibility conditions to ensure these persons are fully competent. This may enhance ship readiness and will decrease the time required to locate and identify a fire as well as reduce the possibility of secondary damage.

8. Computer printouts similar to those obtained during the TEE should be obtained for all training exercises to use as a performance record of

teams undergoing training. These printouts could be sent to the ship as a part of the team's training record and also used by the school to establish normative standards of team training performance.

9. One instructor, in addition to the three now used, is needed in the structure to observe actions remote from the fire scene. For example, a fire in the engineering space requires two investigations after the initial investigation which located the fire. There is no way the investigators can be observed at all locations by the instructor at the scene; therefore, the post-fire critique cannot be complete.

10. Due to the numerous accommodations and shortcomings experienced during this TEE, a follow-up TEE should be conducted on Device 19F1A when it is ready for training.

COMPONENTS AFFECTING THE TRAINING SYSTEM

PUBLICATIONS

11. The manual used by personnel responsible for operating the device, Instructor/Operator Training Course Students' Guide, Volume 1, requires rewriting as an operator's manual. This publication should be submitted to a complete CRES analysis to ensure the readability level meets the criteria established by MIL-M-38784A.

DEVICE 19F1

12. Experimental data should be collected for each fireplace to determine the length of burn time needed for adequate heat build-up in order that a realistic environment be provided. These times should be charted for each fire and posted at the instructor's console. The operator has a clear view of the staging area and is in a position to activate the burn cycle in sufficient time to ensure the desired heat is present when the team arrives on the scene.

13. The fire control parameters program should be reexamined to determine whether the apparent lack of effect of these parameters on the fire lies therein or in the sensor subcomponent.

14. Programming of soak time and its affect on extinguishment requires reexamination. This parameter may not be needed with the fires presently installed.

15. The existing CO_2 sensor in the electric panel should be examined in terms of its technical adequacy and placement to identify the problem of activation by released smoke.

16. The sensors in the present device are either not properly placed, not sufficiently reliable, or not correctly maintained. An investigation of agent sensors is required.

17. A consensus is needed from subject matter experts followed by a decision on proper flame characteristics. The fire control program should then be reworked to ensure these characteristics are met and a policy statement issued which precludes deviation from these characteristics.

STRUCTURE

18. A standard shipboard type hatch with installed scuttle is needed on the roof. Consideration should be given to the installation of a hatch with installed scuttle between the second and third decks.

19. A means of preventing the reflection of fire into adjacent compartments from beneath the gratings is required.

20. The red power-on lights should be reduced in brightness and so placed that they do not illuminate the entire compartment.

21. Vertical entry to the machinery space is needed to permit training on the entry techniques involved. An engineering study is required to determine the best method of installing a safe vertical entry capability.

22. Existing deck grating is adequate, however, consideration should be given to enclosing the space beneath the mess deck grating to simulate a flooded compartment. The ruptured firemain exercise would provide adequate water, and the team could practice in rigging equipment and dewatering the compartment.

23. An investigation should be made to determine whether it would be more training effective to have the firemain rupture affect a fire hose which is in use at the time. This does not now occur. This would give the scene leader additional decision making training; i.e., how to overcome the casualty, and give the team additional training in response to a shipboard casualty situation.

24. There is adequate heat available to ensure the bulkhead and door between the living compartment and machinery space are hot. Removal of the existing bulkhead between the fireplace and the door in the machinery compartment would permit the door to become hot. The installation of simulated piping in place of the bulkhead would provide the needed safety feature which would prevent the fire fighting team from entering the flame. Relocation or shielding of some sensors may be required to preclude the trainees extinguishing the fire from the compartment entrance door rather than entering the compartment and moving to a position in front of the fire.

25. Include as an additional space a room designated Damage Control Central. This room need not be on the roof or within the existing building. Minimum equipment required includes plotting boards, a SP telephone to the repair locker and instructor's station, and a diagram of the structure.

26. Extend or move the control for the shut-off valve for the oil spray/bilge fire to the roof of the building. This moves the valves to the damage control deck as they would be located aboard ship.

27. In the galley, the simulated range is satisfactory, but the Gaylord Hood should be remodeled to include a Range Guard System.

28. Shipboard type lighting, to include breaker panels, should be installed in the training building in order that trainees, specifically electrician mates, can be trained in proper procedures.

29. A ventilation system, which performs similar functions to shipboard ventilation systems and which can be operated by the students, is required. Without this system, some training objectives cannot be met. It should be incorporated in the structure.

30. Two structural alterations are needed to prevent natural wind effects from diminishing the smoke. First, seal the roof and enclose the hatch to prevent the chimney effect and, second, erect a windbreak to surround the base of the structure.

31. An automatic bleed valve is required to remove static propane in the lines between the blocking valve and the fireplaces. This valve's vent, as well as the existing vent, should exhaust well clear of all areas wherein fires are ignited.

SUPPORT SUBSYSTEMS

32. The reason the electric panel fire cannot produce adequate smoke should be determined and the problem eliminated.

33. Smoke problems compromise the realism of training. Sometimes exercises must be rerun because of smoke problems, thereby reducing the number of effective fires which can be fought per hour. An investigation is needed to determine the cause of these problems.

34. All personnel entering the building during exercises which require smoke should be required to wear a self-contained respiratory system and eye protection gear, whether they enter the actual compartment wherein the fire is located or not. In addition, personnel who do not enter the building but are exposed to large quantities of smoke should be required to wear a filter and eye covering (see MIL-STD-882 series). This applies equally to instructors and students.

35. Lack of effective inter-instructor and student/instructor communications during exercises generates a potentially hazardous situation. A means of maintaining continuous communications between instructors which is not dependent on wires is needed. Additionally, the on-scene instructor requires some method of voice amplification in order to contact trainees during stressful periods of training.

36. An engineering study is needed to determine whether the building is usable during cold weather. Should it not be usable, then corrective actions are essential.

37. The existing air sampling system should be maintained fully operable or replaced with a more reliable system.

38. Propane sensors are required beneath the building at the lowest point of depression to detect pockets of this explosive gas.

39. Propane storage should be a minimum of 50 feet from all burn and parking areas to comply with existing safety regulations.

40. Critical ambient temperatures are in the training areas, not in the building exhaust vents. Temperature sensors should be relocated from the vents to each of the four spaces wherein fires occur, with alarms and readouts available to the instructor at the console.

CURRICULUM

41. The curriculum requires expansion to include training in the OBA with tending line attached and used.

42. Each fire presents a different problem to the students. Some are more easily extinguished than others. Criterion times for extinguishment should be established for each type of fire and for each set of parameters anticipated to be used.

43. The school should establish, by means of experimentation and by changing fire parameters, different fires with varying degrees of difficulty to extinguish. Graded fires should be more difficult than practice fires. This will permit performance-based instruction.

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Guilford, J. P. Psychometric Methods. New York: McGraw-Hill, 1954.

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APPENDIX A

LISTING OF EQUIPMENTS AND MATERIALS USED IN THE TEE

LIST OF EQUIPMENTS

Simulated extinguishing agents for Class A, B, and C fires

Two complete repair lockers

Fire station equipment

Training smoke

Protective clothing for testees and testers

Spare OBA canisters

Equipment specific to test (includes -- three stopwatches, three clipboards, recorder/printer compatible with existing computer)

APPENDIX B

KNOWLEDGE TESTS FOR THE GENERAL SHIPBOARD FIRE FIGHTING COURSE

GENERAL SHIPBOARD FIRE FIGHTING COURSE EXAMINATION

PRE-TEST FORM B

Social Security Number _____

Rate _____

Ship Assigned _____

71

1. The three elements necessary to create and sustain a fire are fuel, oxygen, and

(1) vapors.
(2) smoke.
(3) heat.
(4) flash point.

2. A Class A fire is best extinguished by

(1) smothering it.
(2) venting it.
(3) deenergizing it.
(4) cooling it.

3. A Class C fire involves the ignition of

(1) burnable liquids.
(2) burnable metals.
(3) electrical equipment.
(4) insulation.

4. The best extinguishing agent to use on a Class D fire is

(1) CO_2.
(2) PKP.
(3) water.
(4) AFFF.

5. Which of the following represents good fire prevention aboard ship?

(1) Keeping storage areas neat
(2) Reporting electrical damage
(3) Wiping up fuel spillage
(4) All of the above

6. There are two types of fire boundaries, primary and

(1) back-up.
(2) secondary.
(3) safe zone.
(4) buffer zone.

7. The standard length of fire hoses is

   (1) 25 feet.
   (2) 50 feet.
   (3) 75 feet.
   (4) 90 feet.

8. The three sizes of applicators are

   (1) 3 feet, 6 feet, and 10 feet.
   (2) 4 feet, 8 feet, and 10 feet.
   (3) 4 feet, 10 feet, and 12 feet.
   (4) 6 feet, 10 feet, and 12 feet.

9. The best grade of finished foam is a mixture consisting of

   (1) 92% water and 8% foam and air.
   (2) 94% water and 6% foam and air.
   (3) 96% water and 4% foam and air.
   (4) 98% water and 2% foam and air.

10. The P-250 pump is cooled by

    (1) water.
    (2) air.
    (3) oil.
    (4) a built-in cooling system.

11. The suction lift of the P-250 pump can be increased up to 50 feet by using a/an

    (1) FP-180.
    (2) peri-jet.
    (3) submersible pump.
    (4) single jet eductor.

12. Without a suction, the P-250 pump should never run longer than

    (1) 15 seconds.
    (2) 30 seconds.
    (3) 45 seconds.
    (4) 60 seconds.

13. The fuel oil mixture for the P-250 pump is

    (1) ½ pint of oil to 1 gallon of gas.
    (2) ½ pint of oil to 6 gallons of gas.
    (3) 1 pint of oil to 1 gallon of gas.
    (4) 1 pint of oil to 6 gallons of gas.

14. Foam applied to a Class B fire must be applied

(1) off the overhead.
(2) just above the fire.
(3) directly at the fire.
(4) off a vertical surface.

15. When a foam blanket is applied to a Class B fire, _____ should never be used.

(1) high velocity fog
(2) PKP
(3) CO_2
(4) HALON-1301

16. The _____ valve must be opened in order to operate TAFES from the damage control deck.

(1) nitrogen
(2) blue ball
(3) powertrol
(4) manual control

17. TAFES is activated from the engineering spaces by

(1) opening the green ball valve.
(2) opening the black ball valve.
(3) opening the manual control valve.
(4) pulling up the activating lever on the nitrogen bottle.

18. The proper flow rate setting for the AFFF nozzles for machinery spaces is

(1) 30 gallons per minute.
(2) 60 gallons per minute.
(3) 95 gallons per minute.
(4) 125 gallons per minute.

19. The single AFFF hose reel on the damage control deck contains _____ feet of noncollapsible hose.

(1) 50
(2) 75
(3) 100
(4) 125

20. In order to have both AFFF and PKP available at the twin hose reel in the engineering spaces, the operator must open the

(1) black ball valve.
(2) manual control valve.
(3) activating lever on the nitrogen bottle.
(4) green ball valve.

21. In preparing to fight a fire, the wearer of an OBA should set the time at

(1) 15 minutes.
(2) 30 minutes.
(3) 45 minutes.
(4) 60 minutes.

22. Which of the following is an indication that the chlorate candle in the canister did not fire?

(1) The bottom of the canister is warm.
(2) There is too much air in the breathing bag.
(3) Smoke builds up in the face piece.
(4) Problems are encountered in breathing.

23. If, while wearing the OBA, the wearer finds it difficult to inhale, the most probable cause is that the

(1) breathing bag is deflated.
(2) canister is not sealed properly.
(3) breathing bag is over inflated.
(4) canister is not operating properly.

24. The effect of CO_2 on a Class C fire is that the CO_2 will

(1) cool the fire.
(2) smother the fire.
(3) provide reflash protection.
(4) fail to extinguish the fire.

25. CO_2 has an effective fire fighting range of from zero to

(1) 4 feet.
(2) 5 feet.
(3) 6 feet.
(4) 7 feet.

26. Except in an emergency, a space that has been flooded with CO_2 should remain closed for at least

(1) 15 minutes.
(2) 30 minutes.
(3) 45 minutes.
(4) 60 minutes.

27. PKP is safe and effective when used on Class

(1) A and B fires only.
(2) B and C fires only.
(3) C and D fires only.
(4) A, B, C, and D fires.

28. The main concern of a fire party when fighting a weapon fire should be to keep the weapon cooled below

(1) 150 degrees Fahrenheit.
(2) 200 degrees Fahrenheit.
(3) 250 degrees Fahrenheit.
(4) 300 degrees Fahrenheit.

29. Once a weapon fire is extinguished, the fire party should

(1) move back to a safe place and set the reflash watch.
(2) use solid stream to push the weapon over the side.
(3) apply a foam blanket over the weapon.
(4) leave water on the weapon until given directions by an explosive expert.

30. Before a deep fat fryer fire can be extinguished, the first step that must be taken is to

(1) place the dust cover securely on the fryer.
(2) man the total CO_2 flooding system.
(3) secure power to the fryer.
(4) secure the Gaylord Hood.

GENERAL SHIPBOARD FIRE FIGHTING COURSE EXAMINATION

POST TEST FORM C

Social Security Number _____

Rate _____

Ship Assigned _____

??

1. Heat is transmitted by conduction, convection, and

   (1) radiation.
   (2) ignition temperature.
   (3) flash point.
   (4) spontaneous combustion.

2. One of the most recognizable characteristics of a Class B fire is its smoke, which is colored

   (1) white.
   (2) black.
   (3) blue.
   (4) gray.

3. The most common Class D fire involves ignition of

   (1) sodium.
   (2) phosphorous.
   (3) napalm.
   (4) magnesium.

4. Dumping the trash cans daily aboard ship is a good fire prevention procedure.

   (1) True
   (2) False

5. Fire boundaries are set in order to

   (1) prevent a fire from spreading to other compartments.
   (2) establish a safe zone.
   (3) designate an area for casualties.
   (4) mark off a nonpassage area.

6. The two standard sizes of fire hoses aboard ship are

   (1) 3/4 inch and 1 inch.
   (2) 1 inch and 2 inch.
   (3) 1½ inch and 2½ inch.
   (4) 2 inch and 3 inch.

7. The Navy all purpose nozzle has a three position bail. When the bail is in the full forward position, the nozzle is

   (1) open.
   (2) fog.
   (3) solid stream.
   (4) closed.

8. How many lengths of fire hose should be at each fire station?

(1) 1
(2) 2
(3) 3
(4) 4

9. The primary function of the P-250 pump is to

(1) dewater a flooded space.
(2) supply emergency fire fighting water.
(3) increase fire main pressure.
(4) decrease fire main pressure.

10. The P-250 pump is designed to take a suction lift of from

(1) 10 to 16 feet.
(2) 16 to 20 feet.
(3) 20 to 25 feet.
(4) 25 to 30 feet.

11. When the P-250 pump is used to dewater a flooded space, the water should be free of

(1) dirt particles.
(2) oil.
(3) metal filings.
(4) all of the above.

12. Before the P-250 pump is secured, it should be flushed with

(1) low pressure air.
(2) salt water.
(3) 40 weight oil.
(4) fresh water.

13. The best operating pressure for the FP-180 is

(1) 50 to 65 psi.
(2) 65 to 75 psi.
(3) 75 to 175 psi.
(4) 95 to 185 psi.

14. The Navy nozzle that gives the best grade of finished foam is the

(1) Navy all purpose nozzle.
(2) fixed fog foam nozzle.
(3) mechanical foam nozzle.
(4) veri-nozzle.

15. The Twin Agent Fire Extinguishing System (TAFES) involves the use of two agents to extinguish a fire. These are PKP and

(1) CO_2.
(2) AFFF.
(3) water.
(4) protein foam.

16. Once TAFES is charged, the first step to be taken when using the single hose reel on the damage control deck is to open the

(1) hose reel cut-out valve.
(2) black ball valve.
(3) nitrogen valve.
(4) hytrol valve.

17. When TAFES is activated by the manual control valve, the entire system has

(1) both AFFF and PKP to one station only.
(2) both AFFF and PKP to all stations.
(3) PKP only to all stations.
(4) AFFF only to all stations.

18. The first step to take when securing TAFES from machinery space is to

(1) bleed off the PKP.
(2) bleed off the AFFF.
(3) secure the powertrol valve.
(4) secure the nitrogen pressure.

19. The length of the AFFF and PKP hose on the double hose reel in the engineering spaces is

(1) 50 feet.
(2) 75 feet.
(3) 100 feet.
(4) 125 feet.

20. The OBA allows the wearer to

(1) fight fires underwater.
(2) breathe an independent source of oxygen.
(3) see in a smoke filled compartment.
(4) dewater a compartment.

21. Before inserting the canister into the Type A-4 OBA, the wearer should ensure that the OBA handle is

(1) all the way up.
(2) all the way down.
(3) centered on the breast plate assembly.
(4) in any comfortable position.

22. If while wearing the OBA, the wearer finds it difficult to exhale, the most probable cause is that the

(1) breathing bag is deflated.
(2) canister is not sealed properly.
(3) breathing bag is over inflated.
(4) canister is not operating properly.

23. The function of the chlorate candle in the OBA canister is to

(1) provide an initial supply of oxygen.
(2) activate the chemicals in the canister.
(3) furnish an emergency supply of oxygen.
(4) keep the face piece from fogging up.

24. To extinguish a fire, CO_2 should be directed

(1) above the flames.
(2) at the flames.
(3) at the base of the flames.
(4) about 6 feet from the flames.

25. A 15 pound CO_2 bottle will last about

(1) 20 seconds.
(2) 30 seconds.
(3) 40 seconds
(4) 60 seconds.

26. The CO_2 hose and reel system is located in the

(1) computer room spaces.
(2) paint lockers.
(3) flammable liquid storerooms.
(4) engineering spaces.

27. PKP has an effective range of from 5 to

(1) 10 feet.
(2) 15 feet.
(3) 20 feet.
(4) 25 feet.

28. One agent which should never be applied on a burning weapon is

(1) high velocity fog.
(2) low velocity fog.
(3) CO_2.
(4) AFFF.

29. When approaching a weapon fire, the fire party should approach the fire from the windward side

(1) at a 45 degree angle.
(2) from the back of the weapon.
(3) from the front of the weapon.
(4) from the most convenient angle.

30. Using water on a deep fat fryer fire would

(1) cool the grease to below flashpoint.
(2) cause the fire to flame up and spread.
(3) beat the flames down.
(4) have no effect at all on the fire.

GENERAL SHIPBOARD FIRE FIGHTING COURSE EXAMINATION

PRE-TEST FORM I

Social Security Number _____

Rate _____

Ship Assigned _____

93

1. Heat is transmitted by conduction, convection, and

   (1) radiation.
   (2) ignition temperature.
   (3) flash point.
   (4) spontaneous combustion.

2. One of the most recognizable characteristics of a Class B fire is its smoke, which is colored

   (1) white.
   (2) black.
   (3) blue.
   (4) gray.

3. The most common Class D fire involves ignition of

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   (2) phosphorous.
   (3) napalm.
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4. Dumping the trash cans daily aboard ship is a good fire prevention procedure.

   (1) True
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8. How many lengths of fire hose should be at each fire station?

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(3) 3
(4) 4

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(4) 125 feet.

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(2) breathe an independent source of oxygen.
(3) see in a smoke filled compartment.
(4) dewater a compartment.

21. Before inserting the canister into the Type A-4 OBA, the wearer should ensure that the OBA handle is

(1) all the way up.
(2) all the way down.
(3) centered on the breast plate assembly.
(4) in any comfortable position.

22. If while wearing the OBA, the wearer finds it difficult to exhale, the most probable cause is that the

(1) breathing bag is deflated.
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(1) 20 seconds.
(2) 30 seconds.
(3) 40 seconds
(4) 60 seconds.

26. The CO_2 hose and reel system is located in the

(1) computer room spaces.
(2) paint lockers.
(3) flammable liquid storerooms.
(4) engineering spaces.

27. PKP has an effective range of from 5 to

(1) 10 feet.
(2) 15 feet.
(3) 20 feet.
(4) 25 feet.

28. One agent which should never be applied on a burning weapon is

(1) high velocity fog.
(2) low velocity fog.
(3) CO_2.
(4) AFFF.

29. When approaching a weapon fire, the fire party should approach the fire from the windward side

(1) at a 45 degree angle.
(2) from the back of the weapon.
(3) from the front of the weapon.
(4) from the most convenient angle.

30. Using water on a deep fat fryer fire would

(1) cool the grease to below flashpoint.
(2) cause the fire to flame up and spread.
(3) beat the flames down.
(4) have no effect at all on the fire.

GENERAL SHIPBOARD FIRE FIGHTING COURSE EXAMINATION

POST-TEST FORM J

Social Security Number _____

Rate _____

Ship Assigned _____

1. The three elements necessary to create and sustain a fire are fuel, oxygen, and

(1) vapors.
(2) smoke.
(3) heat.
(4) flash point.

2. A Class A fire is best extinguished by

(1) smothering it.
(2) venting it.
(3) deenergizing it.
(4) cooling it.

3. A Class C fire involves the ignition of

(1) burnable liquids.
(2) burnable metals.
(3) electrical equipment.
(4) insulation.

4. The best extinguishing agent to use on a Class D fire is

(1) CO_2.
(2) PKP.
(3) water.
(4) AFFF.

5. Which of the following represents good fire prevention aboard ship?

(1) Keeping storage areas neat
(2) Reporting electrical damage
(3) Wiping up fuel spillage
(4) All of the above

6. There are two types of fire boundaries, primary and

(1) back-up.
(2) secondary.
(3) safe zone.
(4) buffer zone.

90

7. The standard length of fire hoses is

   (1) 25 feet.
   (2) 50 feet.
   (3) 75 feet.
   (4) 90 feet.

8. The three sizes of applicators are

   (1) 3 feet, 6 feet, and 10 feet.
   (2) 4 feet, 8 feet, and 10 feet.
   (3) 4 feet, 10 feet, and 12 feet.
   (4) 6 feet, 10 feet, and 12 feet.

9. The best grade of finished foam is a mixture consisting of

   (1) 92% water and 8% foam and air.
   (2) 94% water and 6% foam and air.
   (3) 96% water and 4% foam and air.
   (4) 98% water and 2% foam and air.

10. The P-250 pump is cooled by

   (1) water.
   (2) air.
   (3) oil.
   (4) a built-in cooling system.

11. The suction lift of the P-250 pump can be increased up to 50 feet by using a/an

   (1) FP-180.
   (2) peri-jet.
   (3) submersible pump.
   (4) single jet eductor.

12. Without a suction, the P-250 pump should never run longer than

   (1) 15 seconds.
   (2) 30 seconds.
   (3) 45 seconds.
   (4) 60 seconds.

13. The fuel oil mixture for the P-250 pump is

   (1) ½ pint of oil to 1 gallon of gas.
   (2) ½ pint of oil to 6 gallons of gas.
   (3) 1 pint of oil to 1 gallon of gas.
   (4) 1 pint of oil to 6 gallons of gas.

14. Foam applied to a Class B fire must be applied

(1) off the overhead.
(2) just above the fire.
(3) directly at the fire.
(4) off a vertical surface.

15. When a foam blanket is applied to a Class B fire, _____ should never be used.

(1) high velocity fog
(2) PKP
(3) CO_2
(4) HALON-1301

16. The _____ valve must be opened in order to operate TAFES from the damage control deck.

(1) nitrogen
(2) blue ball
(3) powertrol
(4) manual control

17. TAFES is activated from the engineering spaces by

(1) opening the green ball valve.
(2) opening the black ball valve.
(3) opening the manual control valve.
(4) pulling up the activating lever on the nitrogen bottle.

18. The proper flow rate setting for the AFFF nozzles for machinery spaces is

(1) 30 gallons per minute.
(2) 60 gallons per minute.
(3) 95 gallons per minute.
(4) 125 gallons per minute.

19. The single AFFF hose reel on the damage control deck contains _____ feet of noncollapsible hose.

(1) 50
(2) 75
(3) 100
(4) 125

20. In order to have both AFFF and PKP available at the twin hose reel in the engineering spaces, the operator must open the

(1) black ball valve.
(2) manual control valve.
(3) activating lever on the nitrogen bottle.
(4) green ball valve.

21. In preparing to fight a fire, the wearer of an OBA should set the time at

(1) 15 minutes.
(2) 30 minutes.
(3) 45 minutes.
(4) 60 minutes.

22. Which of the following is an indication that the chlorate candle in the canister did not fire?

(1) The bottom of the canister is warm.
(2) There is too much air in the breathing bag.
(3) Smoke builds up in the face piece.
(4) Problems are encountered in breathing.

23. If, while wearing the OBA, the wearer finds it difficult to inhale, the most probable cause is that the

(1) breathing bag is deflated.
(2) canister is not sealed properly.
(3) breathing bag is over inflated.
(4) canister is not operating properly.

24. The effect of CO_2 on a Class C fire is that the CO_2 will

(1) cool the fire.
(2) smother the fire.
(3) provide reflash protection.
(4) fail to extinguish the fire.

25. CO_2 has an effective fire fighting range of from zero to

(1) 4 feet.
(2) 5 feet.
(3) 6 feet.
(4) 7 feet.

26. Except in an emergency, a space that has been flooded with CO_2 should remain closed for at least

(1) 15 minutes.
(2) 30 minutes.
(3) 45 minutes.
(4) 60 minutes.

27. PKP is safe and effective when used on Class

(1) A and B fires only.
(2) B and C fires only.
(3) C and D fires only.
(4) A, B, C, and D fires.

28. The main concern of a fire party when fighting a weapon fire should be to keep the weapon cooled below

(1) 150 degrees Fahrenheit.
(2) 200 degrees Fahrenheit.
(3) 250 degrees Fahrenheit.
(4) 300 degrees Fahrenheit.

29. Once a weapon fire is extinguished, the fire party should

(1) move back to a safe place and set the reflash watch.
(2) use solid stream to push the weapon over the side.
(3) apply a foam blanket over the weapon.
(4) leave water on the weapon until given directions by an explosive expert.

30. Before a deep fat fryer fire can be extinguished, the first step that must be taken is to

(1) place the dust cover securely on the fryer.
(2) man the total CO_2 flooding system.
(3) secure power to the fryer.
(4) secure the Gaylord Hood.

APPENDIX C

KNOWLEDGE TESTS FOR THE ADVANCED FIRE FIGHTING TEAM TRAINING COURSE

Technical Report 142

ADVANCED FIRE FIGHTING TEAM TRAINING COURSE EXAMINATION

PRE-TEST FORM E

Social Security Number _____

Rate _____

Ship Assigned _____

Fire Party Assignment _____

1. What are the sizes of the Navy all purpose nozzle?

   A. 2 inch
   B. 1½ inch
   C. 2½ inch
   D. Both B and C

2. Who orders a reflash watch set?

   A. Chief Engineer
   B. On Scene Leader
   C. DCA
   D. No. 1 Nozzleman

3. What type or types of portable eductors are used in the Navy?

   A. Bilge eductor
   B. S-Type eductor and Peri-Jet
   C. PE-250

4. Who gives the permission to use installed ventilation system for Desmoking?

   A. Chief Engineer
   B. Damage Control Assistant
   C. Electrician
   D. On Scene Leader

5. How long will the 15 lb. CO-2 fire extinguisher last under continuous operation?

   A. 2 Minutes
   B. 30 seconds
   C. 40 seconds

6. What is the maximum effective range of a 15 lb. CO-2 extinguisher?

   A. 10 feet
   B. 3 feet
   C. 5 feet

7. When should investigators work in pairs?

   A. During the first investigation only
   B. During secondary survey
   C. During any investigation

8. What is the proper procedure for setting the timer on the OBA?

   A. Turn to 30 minutes and back to 20 minutes
   B. Turn to 45 minutes and back to 20 minutes
   C. Turn to 60 minutes and back to 45 minutes

9. The Inline foam inductor is designed to inject 6 percent AFFF concentrate into sea water with inlet pressure at:

   A. 160 - 180 PSI
   B. 100 - 200 PSI
   C. 160 - 180 lb.
   D. 100 - 200 lb.

10. How long will an 18 lb. PKP extinguisher last in continuous operation?

   A. 10 - 20 min.
   B. 18 - 20 min.
   C. 10 - 20 sec.
   D. 18 - 20 sec.

11. What is the purpose of the explosivemeter?

   A. Test for oxygen
   B. Test for Naptha gases
   C. Test for concentrations of flammable gases and vapors
   D. None above

12. What is the pressure on the nitrogen cylinder on a twin agent unit located in a Main space?

   A. 1200 - 1850
   B. 2200 - 3000
   C. 1500 - 2215
   D. 210 - 230

13. The fire fighter must know what situations exist before he can take action?

   A. Location of fire, and what is burning
   B. What is the extent of the fire
   C. Are OBAs required
   D. Both A and B

14. Investigators are not required to wear OBAs.

   A. True
   B. False

15. During a "HOT DOOR ENTRY" which side of the door must the No. 1 Nozzleman stand?

    A. Hinge side
    B. Open side
    C. Makes no difference

16. When extinguishing a Deep Fat Fryer Fire, what is the first thing that must be done?

    A. Apply PKP and high velocity fog
    B. Secure ventilation damper and electrical power to deep fat fryer
    C. Apply PKP only
    D. Apply PKP and low velocity fog.

17. When the timer bell rings at zero, the user should return to fresh air immediately, even if work is not finished.

    A. True
    B. False

18. Prior to placing a canister into the OBA body, what must you first check for?

    A. Pull tab assembly is intact.
    B. Pull tab assembly is completely removed.
    C. Complete copper seal and a good rubber gasket is visible on top
    D. Both B and C

19. What does the message symbol ∠B mean?

    A. "Bravo" fire is reported
    B. "BRAVO" fire is out
    C. "BRAVO" fire is under control
    D. Reflash watch is set

20. This question requires you to select the proper sequence for donning a A-4 face-piece. Place corresponding letter A thru G in correct sequence:

    A. Tighten side straps
    B. Loosen straps all the way
    C. Tighten lower neck straps
    D. Insert face into facepiece, chin first
    E. Tighten top strap
    F. Repeat A and C
    G. Check for seal

    a) D,B,A,C,E,F, AND G
    b) B,D,A,C,F,E, AND G
    c) B,D,C,A,F,E, AND G
    d) B,D,E,A,C,F, AND G

Technical Report 142

ADVANCED FIRE FIGHTING TEAM TRAINING COURSE EXAMINATION

POST-TEST FORM F

Social Security Number _____

Rate _____

Ship Assigned _____

100

1. What class of fire is AFFF normally used for?

   A. ALPHA FIRE
   B. BRAVO FIRE
   C. CHARLIE FIRE

2. To actuate a PKP unit, you do all except:

   A. Break wire seal and pull guard free.
   B. Lift up on the quick opening lever.
   C. Both A & B
   D. Open Black Ball Valve.

3. When using a solid water stream it acts in the following manner:

   A. Temporary smothering
   B. Permanent smothering
   C. Wetting, cooling, and shielding
   D. Wetting, penetrating and cooling

4. After the alarm is sounded for a Fire all are done except:

   A. Isolate the fire
   B. Lead out one hose
   C. Deenergize electrical circuits
   D. Bring Required Equipment

5. When the Twin Agent Unit is lite off from the DC deck, what must you do before you can use the single agent hose reel on the DC deck?

   A. Open 3-way interlock valve
   B. Close Powertrol Valve
   C. Open cut out valve to hose
   D. None above

6. When overhauling a Class Charlie Fire the overhaul man should:

   A. Secure power in area
   B. Assist the electrician as necessary
   C. Report directly to the Scene Leader

7. To expedite investigation it is okay for the investigators to separate from each other and without the assistance of properly equipped messengers.

   A. True
   B. False

8. Some of the things an investigator would look for are:

   A. Fire
   B. Flooding
   C. Personnel Casualties
   D. All the above

9. The entire OBA will be donned, activated and operationally checked in an atmosphere that is:

   A. Toxic
   B. Contaminated
   C. Oxygen Deficient
   D. None of the above

10. The following are Principles of Investigation except:

   A. Investigation must be thorough
   B. Conducted with caution and must be clearly and quickly reported
   C. Make one round to check for damage and report to on scene leader to help with hoses.
   D. Repeat investigation

11. When inserting a canister into the A-4 OBA the bail must be in the "Up and Locked" position.

   A. True
   B. False

12. How long will a five gallon can of AFFF last when used in a FP-180 foam proportioner?

   A. 90 Seconds
   B. 3 - 4 minutes
   C. 1 hour

13. What is the minimum acceptable amount of oxygen required in a compartment to support life?

   A. 16%
   B. 18%
   C. 20%
   D. 21%

14. What position would you place the bail on an all purpose nozzle to get a solid stream?

   A. All the way forward
   B. Mid-way
   C. All the way back

15. When testing the space after a fire, which instrument is used first?

    A. Dragger
    B. Combustible Gas Indicator (Explosivemeter)
    C. Oxygen Indicator
    D. Flame safety lamp

16. When lighting off the twin agent system from the Auxilary Engine Room, which of the following do you perform?

    A. Lift quick acting lever or nitrogen cylinder
    B. Open hose reel cut out valve
    C. Break lead wire seal and remove safety clip
    D. All of the above (A, B, & C)
    E. Both A & C

17. Who does the electrician report to after securing electrical power to a space?

    A. Investigators
    B. Scene Leader
    C. Overhaul man

18. On a Fuel Oil Spray Fire in the Auxilary Engine Room, who shuts down the "Emergency Stops"?

    A. On Scene Leader
    B. No. 1 Nozzleman
    C. No. 1 Investigator
    D. Accessman

19. How is excess oxygen released from the A-4 OBA?

    A. Breaking seal on facepiece
    B. Disconnecting breathing tube hoses from faceplace
    C. Pulling the "Tab" on the vent valve.

20. Select the proper sequence to manually start the A-4 OBA.

    A. Deflate bags by pressing on right side of bags
    B. Break seal on facepiece by inserting one finger between facepiece and face
    C. Grasp both breathing tubes and squeeze firmly to close off air flow to bags
    D. Inhale
    E. Repeat cycle until bottom of canister is warm
    F. Exhale
    G. Release breathing tubes, remove finger
    H. Continue cycle until bags are full

    a) B,D,C,G,F,A,E, AND H
    b) D,B,C,G,F,H,A, AND E
    c) B,C,D,G,F,H,A, AND E
    d) C,B,D,G,F,A,E, AND H

Technical Report 142

ADVANCED FIRE FIGHTING TEAM TRAINING COURSE EXAMINATION

PRE-TEST FORM L

Social Security Number _____

Rate _____

Ship Assigned _____

Fire Party Assignment _____

1. What class of fire is AFFF normally used for?

   A. ALPHA FIRE
   B. BRAVO FIRE
   C. CHARLIE FIRE

2. To actuate a PKP unit, you do all except:

   A. Break wire seal and pull guard free.
   B. Lift up on the quick opening lever.
   C. Both A & B
   D. Open Black Ball Valve.

3. When using a solid water stream it acts in the following manner:

   A. Temporary smothering
   B. Permanent smothering
   C. Wetting, cooling, and shielding
   D. Wetting, penetrating and cooling

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   A. Isolate the fire
   B. Lead out one hose
   C. Deenergize electrical circuits
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   C. Open cut out valve to hose
   D. None above

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   A. Secure power in area
   B. Assist the electrician as necessary
   C. Report directly to the Scene Leader

7. To expedite investigation it is okay for the investigators to separate from each other and without the assistance of properly equipped messengers.

   A. True
   B. False

8. Some of the things an investigator would look for are:

   A. Fire
   B. Flooding
   C. Personnel Casualties
   D. All the above

9. The entire OBA will be donned, activated and operationally checked in an atmosphere that is:

   A. Toxic
   B. Contaminated
   C. Oxygen Deficient
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   A. True
   B. False

12. How long will a five gallon can of AFFF last when used in a FP-180 foam proportioner?

   A. 90 Seconds
   B. 3 - 4 minutes
   C. 1 hour

13. What is the minimum acceptable amount of oxygen required in a compartment to support life?

   A. 16%
   B. 18%
   C. 20%
   D. 21%

14. What position would you place the bail on an all purpose nozzle to get a solid stream?

   A. All the way forward
   B. Mid-way
   C. All the way back

15. When testing the space after a fire, which instrument is used first?

   A. Dragger
   B. Combustible Gas Indicator (Explosivemeter)
   C. Oxygen Indicator
   D. Flame safety lamp

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    A. Lift quick acting lever or nitrogen cylinder
    B. Open hose reel cut out valve
    C. Break lead wire seal and remove safety clip
    D. All of the above (A, B, & C)
    E. Both A & C

17. Who does the electrician report to after securing electrical power to a space?

    A. Investigators
    B. Scene Leader
    C. Overhaul man

18. On a Fuel Oil Spray Fire in the Auxilary Engine Room, who shuts down the "Emergency Stops"?

    A. On Scene Leader
    B. No. 1 Nozzleman
    C. No. 1 Investigator
    D. Accessman

19. How is excess oxygen released from the A-4 OBA?

    A. Breaking seal on facepiece
    B. Disconnecting breathing tube hoses from facepiece
    C. Pulling the "Tab" on the vent valve.

20. Select the proper sequence to manually start the A-4 OBA.

    A. Deflate bags by pressing on right side of bags
    B. Break seal on facepiece by inserting one finger between facepiece and face
    C. Grasp both breathing tubes and squeeze firmly to close off air flow to bags
    D. Inhale
    E. Repeat cycle until bottom of canister is warm
    F. Exhale
    G. Release breathing tubes, remove finger
    H. Continue cycle until bags are full

        a) B,D,C,G,F,A,E, AND H
        b) D,B,C,G,F,H,A, AND E
        c) B,C,D,G,F,H,A, AND E
        d) C,B,D,G,F,A,E, AND H

Technical Report 142

ADVANCED FIRE FIGHTING TEAM TRAINING COURSE EXAMINATION

PRE-TEST FORM M

Social Security Number _____

Rate _____

Ship Assigned _____

1. What are the sizes of the Navy all purpose nozzle?

   A. 2 inch
   B. 1½ inch
   C. 2½ inch
   D. Both B and C

2. Who orders a reflash watch set?

   A. Chief Engineer
   B. On Scene Leader
   C. DCA
   D. No. 1 Nozzleman

3. What type or types of portable eductors are used in the Navy?

   A. Bilge eductor
   B. S-Type eductor and Peri-Jet
   C. PE-250

4. Who gives the permission to use installed ventilation system for Desmoking?

   A. Chief Engineer
   B. Damage Control Assistant
   C. Electrician
   D. On Scene Leader

5. How long will the 15 lb. CO-2 fire extinguisher last under continuous operation?

   A. 2 Minutes
   B. 30 seconds
   C. 40 seconds

6. What is the maximum effective range of a 15 lb. CO-2 extinguisher?

   A. 10 feet
   B. 3 feet
   C. 5 feet

7. When should investigators work in pairs?

   A. During the first investigation only
   B. During secondary survey
   C. During any investigation

8. What is the proper procedure for setting the timer on the OBA?

   A. Turn to 30 minutes and back to 20 minutes
   B. Turn to 45 minutes and back to 20 minutes
   C. Turn to 60 minutes and back to 45 minutes

9. The Inline foam inductor is designed to inject 6 percent AFFF concentrate into sea water with inlet pressure at:

   A. 160 - 180 PSI
   B. 100 - 200 PSI
   C. 160 - 180 lb.
   D. 100 - 200 lb.

10. How long will an 18 lb. PKP extinguisher last in continuous operation?

   A. 10 - 20 min.
   B. 18 - 20 min.
   C. 10 - 20 sec.
   D. 18 - 20 sec.

11. What is the purpose of the explosivemeter?

   A. Test for oxygen
   B. Test for Naptha gases
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12. What is the pressure on the nitrogen cylinder on a twin agent unit located in a Main space?

   A. 1200 - 1850
   B. 2200 - 3000
   C. 1500 - 2215
   D. 210 - 230

13. The fire fighter must know what situations exist before he can take action?

   A. Location of fire, and what is burning
   B. What is the extent of the fire
   C. Are OBAs required
   D. Both A and B

14. Investigators are not required to wear OBAs.

   A. True
   B. False

15. During a "HOT DOOR ENTRY" which side of the door must the No. 1 Nozzleman stand?

   A. Hinge side
   B. Open side
   C. Makes no difference

16. When extinguishing a Deep Fat Fryer Fire, what is the first thing that must be done?

    A. Apply PKP and high velocity fog
    B. Secure ventilation damper and electrical power to deep fat fryer
    C. Apply PKP only
    D. Apply PKP and low velocity fog.

17. When the timer bell rings at zero, the user should return to fresh air immediately, even if work is not finished.

    A. True
    B. False

18. Prior to placing a canister into the OBA body, what must you first check for?

    A. Pull tab assembly is intact.
    B. Pull tab assembly is completely removed.
    C. Complete copper seal and a good rubber gasket is visible on top
    D. Both B and C

19. What does the message symbol ∠B mean?

    A. "Bravo" fire is reported
    B. "BRAVO" fire is out
    C. "BRAVO" fire is under control
    D. Reflash watch is set

20. This question requires you to select the proper sequence for donning a A-4 face-piece. Place corresponding letter A thru G in correct sequence:

    A. Tighten side straps
    B. Loosen straps all the way
    C. Tighten lower neck straps
    D. Insert face into facepiece, chin first
    E. Tighten top strap
    F. Repeat A and C
    G. Check for seal

    a) D,B,A,C,E,F, AND G
    b) B,D,A,C,F,E, AND G
    c) B,D,C,A,F,E, AND G
    d) B,D,E,A,C,F, AND G

APPENDIX D

STUDENT ATTITUDE QUESTIONNAIRE

STUDENT FIRE FIGHTING TRAINING QUESTIONNAIRE

FORM A

Social Security Number _____

Rate _____

Ship Assigned _____

Station at: 1. General Quarters _____

2. Condition Three _____

This questionnaire will be used to determine the degree of confidence and attitudes toward fire fighting training that students have concerning their ability to fight a shipboard fire. Answers to this questionnaire will be used to insure that training programs for shipboard fire fighting requirements meet student needs as well as fleet needs. Every effort will be made to insure individual answers remain confidential and will not be made a part of any of your records. Please respond to each item using your own best judgment or opinion.

This set of statements deals with how confident you are of your ability to perform duties in fighting a fire aboard your ship. Please mark the number that best describes your feeling about each of the statements.

	Extremely Confident	Considerably Confident	Confident	Less Than Confident	Not At All Confident
1. I could select the proper fire fighting equipment.	(1)	(2)	(3)	(4)	(5)
2. I could use the proper fire fighting equipment.	(1)	(2)	(3)	(4)	(5)
3. I could select the proper extinguishing agents.	(1)	(2)	(3)	(4)	(5)
4. I could properly apply the correct extinguishing agents.	(1)	(2)	(3)	(4)	(5)
5. I could put on personal protective fire fighting clothing and equipment.	(1)	(2)	(3)	(4)	(5)
6. I could use personal protective fire fighting equipment.	(1)	(2)	(3)	(4)	(5)
7. I could perform duties close to the flames in a severe fire and smoke-filled compartment.	(1)	(2)	(3)	(4)	(5)
8. I could do a better job of fighting an actual fire than most of my shipmates.	(1)	(2)	(3)	(4)	(5)
9. I can perform my watch and work station duties better than most of my shipmates of equal rating.	(1)	(2)	(3)	(4)	(5)

This set of questions deals with how helpful you think fire fighting training and assignments are for insuring the safety of your ship as well as being beneficial to your Navy career.

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
10. How helpful are practice fire drills to insure that people muster at their assigned stations?	(1)	(2)	(3)	(4)	(5)
11. How helpful is your shipboard training to teach people proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
12. How helpful are in-port practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
13. How helpful are regular (underway) practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
14. How helpful is assignment to an in-port fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
15. How helpful is assignment to a regular (underway) fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
16. How helpful is assignment to an "in-port" fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
17. How helpful is assignment to a regular (underway) fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)
18. How helpful is assignment to an in-port fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)
19. How helpful is assignment to a regular (underway) fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)

The next statements deal with whether assignment to a fire party aboard your ship is a desirable assignment.

		Very Desirable	Desirable	Neither Desirable or Undesirable	Undesirable	Very Undesirable
20.	How would you consider assignment to an in-port fire party?	(1)	(2)	(3)	(4)	(5)
21.	How would you consider assignment to a regular (underway) fire party?	(1)	(2)	(3)	(4)	(5)
22.	How do you consider assignment to this course for fire fighting training?	(1)	(2)	(3)	(4)	(5)

The following paired statements deal with what are considered appropriate objectives in fighting a fire. Please select one objective from each pair that you consider as most important. Mark the item in each pair that you feel is most important. Although some pairs may appear equally important you must select one item only from each pair.

23. ( ) Contain/extinguish the fire
    ( ) Protect myself from risk of personal injury

24. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Remove/provide injured personnel with medical assistance

25. ( ) Protect myself from risk of personal injury
    ( ) Protect others in the fire party from injury

26. ( ) Remove/provide injured personnel with medical assistance
    ( ) Contain/extinguish the fire

27. ( ) Protect others in the fire party from injury
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

28. ( ) Remove/provide injured personnel with medical assistance
    ( ) Protect myself from risk of personal injury

29. ( ) Contain/extinguish the fire
    ( ) Protect others in the fire party from injury

30. ( ) Protect myself from risk of personal injury
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

31. ( ) Protect others in the fire party from injury
    ( ) Remove/provide injured pesonnel with medical assistance

32. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Contain/extinguish the fire

STUDENT FIRE FIGHTING TRAINING QUESTIONNAIRE

FORM D

Social Security Number _____

Rate _____

Ship Assigned _____

Station at: 1. General Quarters _____

2. Condition Three _____

This questionnaire will be used to determine the degree of confidence and attitudes toward fire fighting training that students have concerning their ability to fight a shipboard fire. Answers to this questionnaire will be used to insure that training programs for shipboard fire fighting requirements meet student needs as well as fleet needs. Every effort will be made to insure individual answers remain confidential and will not be made a part of any of your records. Please respond to each item using your own best judgment or opinion.

The following questions identify your background and experience concerning shipboard fire fighting. Please mark the number of the appropriate answer.

1. Have you participated in fighting an actual shipboard fire?

(1) Yes
(2) No

2. Had you completed a formal shore based training course in fire fighting prior to this course?

(1) Yes
(2) No

3. Have you ever been or are you now assigned to an "in-port" fire party aboard your ship?

(1) Yes
(2) No

4. How long have you been assigned to an "in-port" fire party aboard your ship?

(1) Never been assigned
(2) Less than one week
(3) One week to one month
(4) One month to three months
(5) Over three months

5. Approximately how often does the in-port fire party conduct practice drills aboard your ship?

(1) Do not conduct practice fire drills
(2) Once a day
(3) Once a week
(4) Once a month
(5) Don't know

6. Are practice drills for the in-port fire party conducted with equipment?

(1) Always
(2) Usually
(3) Seldom
(4) Never
(5) Don't know

7. Have you ever been or are you now assigned to a regular (underway) fire party aboard your ship?

(1) Yes
(2) No

8. How long have you been assigned to a regular (underway) fire party aboard your ship?

(1) Never been assigned
(2) Less than one week
(3) One week to one month
(4) One month to three months
(5) Over three months

9. Approximately how often does the regular fire party conduct practice drills aboard your ship?

(1) Do not conduct practice fire drills
(2) Once a day
(3) Once a week
(4) Once a month
(5) Don't know

10. Are practice fire drills for the regular (underway) fire party conducted with equipment?

(1) Always
(2) Usually
(3) Seldom
(4) Never
(5) Don't know

This set of statements deals with how confident you are of your ability to perform duties in fighting a fire aboard your ship. Please mark the number that best describes your feeling about each of the statements.

	Extremely Confident	Considerably Confident	Confident	Less Than Confident	Not At All Confident
11. I could select the proper fire fighting equipment	(1)	(2)	(3)	(4)	(5)
12. I could use the proper fire fighting equipment	(1)	(2)	(3)	(4)	(5)
13. I could select the proper extinguishing agents	(1)	(2)	(3)	(4)	(5)
14. I could properly apply the correct extinguishing agents	(1)	(2)	(3)	(4)	(5)
15. I could put on personal protective fire fighting clothing and equipment	(1)	(2)	(3)	(4)	(5)
16. I could use personal protective fire fighting equipment	(1)	(2)	(3)	(4)	(5)
17. I could perform duties close to the flames in a severe fire and smoke-filled compartment	(1)	(2)	(3)	(4)	(5)
18. I could do a better job of fighting an actual fire than most of my shipmates	(1)	(2)	(3)	(4)	(5)
19. I can perform my watch and work station duties better than most of my shipmates of equal rating	(1)	(2)	(3)	(4)	(5)

This set of questions deals with how helpful you think fire fighting training and assignments are for insuring the safety of your ship as well as being beneficial to your Navy career.

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
20. How helpful are practice fire drills to insure that people muster at their assigned stations?	(1)	(2)	(3)	(4)	(5)
21. How helpful is your shipboard training to teach people proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
22. How helpful are in-port practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
23. How helpful are regular (underway) practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
24. How helpful is assignment to an in-port fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
25. How helpful is assignment to a regular (underway) fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
26. How helpful is assignment to an "in-port" fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
27. How helpful is assignment to a regular (underway) fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)
28. How helpful is assignment to an in-port fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)
29. How helpful is assignment to a regular (underway) fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)

The next statements deal with whether assignment to a fire party aboard your ship is a desirable assignment.

	Very Desirable	Desirable	Neither Desirable or Undesirable	Undesirable	Very Undesirable
30. How would you consider assignment to an in-port fire party?	(1)	(2)	(3)	(4)	(5)
31. How would you consider assignment to a regular (underway) fire party?	(1)	(2)	(3)	(4)	(5)
32. How do you consider assignment to this course for fire fighting training?	(1)	(2)	(3)	(4)	(5)

The following paired statements deal with what are considered appropriate objectives in fighting a fire. Please select one objective from each pair that you consider as most important. Mark the item in each pair that you feel is most important. Although some pairs may appear equally important you must select one item only from each pair.

33. ( ) Remove/provide injured personnel with medical assistance
    ( ) Prevent further damage to the ship that may result from fire fighting efforts

34. ( ) Protect myself from risk of personal injury
    ( ) Control/extinguish the fire

35. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Protect others in the fire party from injury

36. ( ) Contain/extinguish the fire
    ( ) Remove/provide injured personnel with medical assistance

37. ( ) Protect others in the fire party from injury
    ( ) Protect myself from risk of personal injury

38. ( ) Contain/extinguish the fire
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

39. ( ) Remove/provide injured personnel with medical assistance
    ( ) Protect others in the fire party from injury

40. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Protect myself from risk of personal injury

41. ( ) Protect others in the fire party from injury
    ( ) Contain/extinguish the fire

42. ( ) Protect myself from risk of personal injury
    ( ) Remove/provide injured pesonnel with medical assistance

STUDENT FIRE FIGHTING TRAINING QUESTIONNAIRE

FORM G

Social Security Number _____

Rate _____

Ship Assigned _____

Station at: 1. General Quarters _____

2. Condition Three _____

This questionnaire will be used to determine the degree of confidence and attitudes toward fire fighting training that students have concerning their ability to fight a shipboard fire. Answers to this questionnaire will be used to insure that training programs for shipboard fire fighting requirements meet student needs as well as fleet needs. Every effort will be made to insure individual answers remain confidential and will not be made a part of any of your records. Please respond to each item using your own best judgment or opinion.

This set of statements deals with how confident you are of your ability to perform duties in fighting a fire aboard your ship. Please mark the number that best describes your feeling about each of the statements.

	Extremely Confident	Considerably Confident	Confident	Less Than Confident	Not At All Confident
1. I could select the proper fire fighting equipment.	(1)	(2)	(3)	(4)	(5)
2. I could use the proper fire fighting equipment.	(1)	(2)	(3)	(4)	(5)
3. I could select the proper extinguishing agents.	(1)	(2)	(3)	(4)	(5)
4. I could properly apply the correct extinguishing agents.	(1)	(2)	(3)	(4)	(5)
5. I could put on personal protective fire fighting clothing and equipment.	(1)	(2)	(3)	(4)	(5)
6. I could use personal protective fire fighting equipment.	(1)	(2)	(3)	(4)	(5)
7. I could perform duties close to the flames in a severe fire and smoke-filled compartment.	(1)	(2)	(3)	(4)	(5)
8. I could do a better job of fighting an actual fire than most of my shipmates.	(1)	(2)	(3)	(4)	(5)
9. I can perform my watch and work station duties better than most of my shipmates of equal rating.	(1)	(2)	(3)	(4)	(5)

This set of questions deals with how helpful you think fire fighting training and assignments are for insuring the safety of your ship as well as being beneficial to your Navy career.

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
10. How helpful are practice fire drills to insure that people muster at their assigned stations?	(1)	(2)	(3)	(4)	(5)
11. How helpful is your shipboard training to teach people proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
12. How helpful are in-port practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
13. How helpful are regular (underway) practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
14. How helpful is assignment to an in-port fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
15. How helpful is assignment to a regular (underway) fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
16. How helpful is assignment to an "in-port" fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
17. How helpful is assignment to a regular (underway) fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)
18. How helpful is assignment to an in-port fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)
19. How helpful is assignment to a regular (underway) fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)

The next statements deal with whether assignment to a fire party aboard your ship is a desirable assignment.

	Very Desirable	Desirable	Neither Desirable or Undesirable	Undesirable	Very Undesirable
20. How would you consider assignment to an in-port fire party?	(1)	(2)	(3)	(4)	(5)
21. How would you consider assignment to a regular (underway) fire party?	(1)	(2)	(3)	(4)	(5)
22. How do you consider assignment to this course for fire fighting training?	(1)	(2)	(3)	(4)	(5)

The following paired statements deal with what are considered appropriate objectives in fighting a fire. Please select one objective from each pair that you consider as most important. Mark the item in each pair that you feel is most important. Although some pairs may appear equally important you must select one item only from each pair.

23. ( ) Contain/extinguish the fire
    ( ) Protect myself from risk of personal injury

24. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Remove/provide injured personnel with medical assistance

25. ( ) Protect myself from risk of personal injury
    ( ) Protect others in the fire party from injury

26. ( ) Remove/provide injured personnel with medical assistance
    ( ) Contain/extinguish the fire

27. ( ) Protect others in the fire party from injury
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

28. ( ) Remove/provide injured personnel with medical assistance
    ( ) Protect myself from risk of personal injury

29. ( ) Contain/extinguish the fire
    ( ) Protect others in the fire party from injury

30. ( ) Protect myself from risk of personal injury
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

31. ( ) Protect others in the fire party from injury
    ( ) Remove/provide injured pesonnel with medical assistance

32. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Contain/extinguish the fire

The following paired statements deal with the value of training that you may have received during the Advanced Fire Fighting Team Training Course (J-495-0424). Consider each pair of statments and select one statement from each pair that you consider as most helpful during your training. Although some pairs may appear equally helpful you must select one item only from each pair.

33. ( ) Training in teamwork and communications
    ( ) Training in how to perform my individual duties as required by my position

34. ( ) Training in how to perform other than my own duties on the fire party (cross training)
    ( ) Training in how to properly use fire fighting equipment

35. ( ) Training in how to perform my individual duties as required by my position
    ( ) Training was not necessary because of my previous knowledge and training

36. ( ) Training in how to properly use fire fighiing equipment
    ( ) Training in teamwork and communications

37. ( ) Training was not necessary because of my previous knowledge and training
    ( ) Training in how to perform other than my own duties on the fire party (cross training)

38. ( ) Training in how to properly use fire fighting equipment
    ( ) Training in how to perform my individual duties as required by my position

39. ( ) Training in teamwork and communications
    ( ) Training was not necessary because of my previous knowledge and training

40. ( ) Training in how to perform my individual duties as required by my position
    ( ) Training in how to perform other than my own duties on the fire party (cross training)

41. ( ) Training was not necessary because of my previous knowledge and training
    ( ) Training in how to properly use fire fighting equipnent

42. ( ) Training in how to perform other than my own duties on the fire party (cross training)
    ( ) Training in teamwork and communications

STUDENT FIRE FIGHTING TRAINING QUESTIONNAIRE

FORM H

Social Security Number _____

Rate _____

Ship Assigned _____

Station at: 1. General Quarters _____

2. Condition Three _____

This questionnaire will be used to determine the degree of confidence and attitudes toward fire fighting training that students have concerning their ability to fight a shipboard fire. Answers to this questionnaire will be used to insure that training programs for shipboard fire fighting requirements meet student needs as well as fleet needs. Every effort will be made to insure individual answers remain confidential and will not be made a part of any of your records. Please respond to each item using your own best judgment or opinion.

This set of statements deals with how confident you are of your ability to perform duties in fighting a fire aboard your ship. Please mark the number that best describes your feeling about each of the statements.

		Extremely Confident	Considerably Confident	Confident	Less Than Confident	Not At All Confident
1.	I could select the proper fire fighting equipment	(1)	(2)	(3)	(4)	(5)
2.	I could use the proper fire fighting equipment	(1)	(2)	(3)	(4)	(5)
3.	I could select the proper extinguishing agents	(1)	(2)	(3)	(4)	(5)
4.	I could properly apply the correct extinguishing agents	(1)	(2)	(3)	(4)	(5)
5.	I could put on personal protective fire fighting clothing and equipment	(1)	(2)	(3)	(4)	(5)
6.	I could use personal protective fire fighting equipment	(1)	(2)	(3)	(4)	(5)
7.	I could perform duties close to the flames in a severe fire and smoke-filled compartment	(1)	(2)	(3)	(4)	(5)
8.	I could do a better job of fighting an actual fire than most of my shipmates	(1)	(2)	(3)	(4)	(5)
9.	I can perform my watch and work station duties better than most of my shipmates of equal rating	(1)	(2)	(3)	(4)	(5)

This set of questions deals with how helpful you think fire fighting training and assignments are for insuring the safety of your ship as well as being beneficial to your Navy career.

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
10. How helpful are practice fire drills to insure that people muster at their assigned stations?	(1)	(2)	(3)	(4)	(5)
11. How helpful is your shipboard training to teach people proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
12. How helpful are in-port practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
13. How helpful are regular (underway) practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
14. How helpful is assignment to an in-port fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
15. How helpful is assignment to a regular (underway) fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
16. How helpful is assignment to an "in-port" fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
17. How helpful is assignment to a regular (underway) fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)
18. How helpful is assignment to an in-port fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)
19. How helpful is assignment to a regular (underway) fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)

The next statements deal with whether assignment to a fire party aboard your ship is a desirable assignment.

	Very Desirable	Desirable	Neither Desirable or Undesirable	Undesirable	Very Undesirable
20. How would you consider assignment to an in-port fire party?	(1)	(2)	(3)	(4)	(5)
21. How would you consider assignment to a regular (underway) fire party?	(1)	(2)	(3)	(4)	(5)
22. How do you consider assignment to this course for fire fighting training?	(1)	(2)	(3)	(4)	(5)

The following paired statements deal with what are considered appropriate objectives in fighting a fire. Please select one objective from each pair that you consider as most important. Mark the item in each pair that you feel is most important. Although some pairs may appear equally important you must select one item only from each pair.

33. ( ) Remove/provide injured personnel with medical assistance
    ( ) Prevent further damage to the ship that may result from fire fighting efforts

34. ( ) Protect myself from risk of personal injury
    ( ) Control/extinguish the fire

35. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Protect others in the fire party from injury

36. ( ) Contain/extinguish the fire
    ( ) Remove/provide injured personnel with medical assistance

37. ( ) Protect others in the fire party from injury
    ( ) Protect myself from risk of personal injury

38. ( ) Contain/extinguish the fire
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

39. ( ) Remove/provide injured personnel with medical assistance
    ( ) Protect others in the fire party from injury

40. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Protect myself from risk of personal injury

41. ( ) Protect others in the fire party from injury
    ( ) Contain/extinguish the fire

42. ( ) Protect myself from risk of personal injury
    ( ) Remove/provide injured pesonnel with medical assistance

STUDENT FIRE FIGHTING TRAINING QUESTIONNAIRE

FORM K

Social Security Number _____

Rate _____

Ship Assigned _____

Station at: 1. General Quarters _____

2. Condition Three _____

This questionnaire will be used to determine the degree of confidence and attitudes toward fire fighting training that students have concerning their ability to fight a shipboard fire. Answers to this questionnaire will be used to insure that training programs for shipboard fire fighting requirements meet student needs as well as fleet needs. Every effort will be made to insure individual answers remain confidential and will not be made a part of any of your records. Please respond to each item using your own best judgment or opinion.

5 1

The following questions identify your background and experience concerning shipboard fire fighting. Please mark the number of the appropriate answer.

1. Have you participated in fighting an actual shipboard fire?

(1) Yes
(2) No

2. Had you completed a formal shore based training course in fire fighting prior to this course?

(1) Yes
(2) No

3. Have you ever been or are you now assigned to an "in-port" fire party aboard your ship?

(1) Yes
(2) No

4. How long have you been assigned to an "in-port" fire party aboard your ship?

(1) Never been assigned
(2) Less than one week
(3) One week to one month
(4) One month to three months
(5) Over three months

5. Approximately how often does the in-port fire party conduct practice drills aboard your ship?

(1) Do not conduct practice fire drills
(2) Once a day
(3) Once a week
(4) Once a month
(5) Don't know

6. Are practice drills for the in-port fire party conducted with equipment?

(1) Always
(2) Usually
(3) Seldom
(4) Never
(5) Don't know

7. Have you ever been or are you now assigned to a regular (underway) fire party aboard your ship?

(1) Yes
(2) No

8. How long have you been assigned to a regular (underway) fire party aboard your ship?

(1) Never been assigned
(2) Less than one week
(3) One week to one month
(4) One month to three months
(5) Over three months

9. Approximately how often does the regular fire party conduct practice drills aboard your ship?

(1) Do not conduct practice fire drills
(2) Once a day
(3) Once a week
(4) Once a month
(5) Don't know

10. Are practice fire drills for the regular (underway) fire party conducted with equipment?

(1) Always
(2) Usually
(3) Seldom
(4) Never
(5) Don't know

This set of statements deals with how confident you are of your ability to perform duties in fighting a fire aboard your ship. Please mark the number that best describes your feeling about each of the statements.

	Extremely Confident	Considerably Confident	Confident	Less Than Confident	Not At All Confident
11. I could select the proper fire fighting equipment	(1)	(2)	(3)	(4)	(5)
12. I could use the proper fire fighting equipment	(1)	(2)	(3)	(4)	(5)
13. I could select the proper extinguishing agents	(1)	(2)	(3)	(4)	(5)
14. I could properly apply the correct extinguishing agents	(1)	(2)	(3)	(4)	(5)
15. I could put on personal protective fire fighting clothing and equipment	(1)	(2)	(3)	(4)	(5)
16. I could use personal protective fire fighting equipment	(1)	(2)	(3)	(4)	(5)
17. I could perform duties close to the flames in a severe fire and smoke-filled compartment	(1)	(2)	(3)	(4)	(5)
18. I could do a better job of fighting an actual fire than most of my shipmates	(1)	(2)	(3)	(4)	(5)
19. I can perform my watch and work station duties better than most of my shipmates of equal rating	(1)	(2)	(3)	(4)	(5)

This set of questions deals with how helpful you think fire fighting training and assignments are for insuring the safety of your ship as well as being beneficial to your Navy career.

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
20. How helpful are practice fire drills to insure that people muster at their assigned stations?	(1)	(2)	(3)	(4)	(5)
21. How helpful is your shipboard training to teach people proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
22. How helpful are in-port practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
23. How helpful are regular (underway) practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
24. How helpful is assignment to an in-port fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
25. How helpful is assignment to a regular (underway) fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
26. How helpful is assignment to an "in-port" fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
27. How helpful is assignment to a regular (underway) fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)
28. How helpful is assignment to an in-port fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)
29. How helpful is assignment to a regular (underway) fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)

The next statements deal with whether assignment to a fire party aboard your ship is a desirable assignment.

	Very Desirable	Desirable	Neither Desirable or Undesirable	Undesirable	Very Undesirable
30. How would you consider assignment to an in-port fire party?	(1)	(2)	(3)	(4)	(5)
31. How would you consider assignment to a regular (underway) fire party?	(1)	(2)	(3)	(4)	(5)
32. How do you consider assignment to this course for fire fighting training?	(1)	(2)	(3)	(4)	(5)

The following paired statements deal with what are considered appropriate objectives in fighting a fire. Please select one objective from each pair that you consider as most important. Mark the item in each pair that you feel is most important. Although some pairs may appear equally important you must select one item only from each pair.

33. ( ) Contain/extinguish the fire
    ( ) Protect myself from risk of personal injury

34. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Remove/provide injured personnel with medical assistance

35. ( ) Protect myself from risk of personal injury
    ( ) Protect others in the fire party from injury

36. ( ) Remove/provide injured personnel with medical assistance
    ( ) Contain/extinguish the fire

37. ( ) Protect others in the fire party from injury
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

38. ( ) Remove/provide injured personnel with medical assistance
    ( ) Protect myself from risk of personal injury

39. ( ) Contain/extinguish the fire
    ( ) Protect others in the fire party from injury

40. ( ) Protect myself from risk of personal injury
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

41. ( ) Protect others in the fire party from injury
    ( ) Remove/provide injured pesonnel with medical assistance

42. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Contain/extinguish the fire

STUDENT FIRE FIGHTING TRAINING QUESTIONNAIRE

FORM N

Social Security Number _____

Rate _____

Ship Assigned _____

Station at: 1. General Quarters _____

2. Condition Three _____

This questionnaire will be used to determine the degree of confidence and attitudes toward fire fighting training that students have concerning their ability to fight a shipboard fire. Answers to this questionnaire will be used to insure that training programs for shipboard fire fighting requirements meet student needs as well as fleet needs. Every effort will be made to insure individual answers remain confidential and will not be made a part of any of your records. Please respond to each item using your own best judgment or opinion.

This set of statements deals with how confident you are of your ability to perform duties in fighting a fire aboard your ship. Please mark the number that best describes your feeling about each of the statements.

		Extremely Confident	Considerably Confident	Confident	Less Than Confident	Not At All Confident
1.	I could select the proper fire fighting equipment	(1)	(2)	(3)	(4)	(5)
2.	I could use the proper fire fighting equipment	(1)	(2)	(3)	(4)	(5)
3.	I could select the proper extinguishing agents	(1)	(2)	(3)	(4)	(5)
4.	I could properly apply the correct extinguishing agents	(1)	(2)	(3)	(4)	(5)
5.	I could put on personal protective fire fighting clothing and equipment	(1)	(2)	(3)	(4)	(5)
6.	I could use personal protective fire fighting equipment	(1)	(2)	(3)	(4)	(5)
7.	I could perform duties close to the flames in a severe fire and smoke-filled compartment	(1)	(2)	(3)	(4)	(5)
8.	I could do a better job of fighting an actual fire than most of my shipmates	(1)	(2)	(3)	(4)	(5)
9.	I can perform my watch and work station duties better than most of my shipmates of equal rating	(1)	(2)	(3)	(4)	(5)

This set of questions deals with how helpful you think fire fighting training and assignments are for insuring the safety of your ship as well as being beneficial to your Navy career.

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
10. How helpful are practice fire drills to insure that people muster at their assigned stations?	(1)	(2)	(3)	(4)	(5)
11. How helpful is your shipboard training to teach people proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
12. How helpful are in-port practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
13. How helpful are regular (underway) practice fire drills to insure that people know the proper methods for fighting a fire?	(1)	(2)	(3)	(4)	(5)
14. How helpful is assignment to an in-port fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
15. How helpful is assignment to a regular (underway) fire party for your next promotion?	(1)	(2)	(3)	(4)	(5)
16. How helpful is assignment to an "in-port" fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)

	Extremely Helpful	Very Helpful	Helpful	Of Little Help	Not At All Helpful
17. How helpful is assignment to a regular (underway) fire party for showing your skills and abilities to your supervisors?	(1)	(2)	(3)	(4)	(5)
18. How helpful is assignment to an in-port fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)
19. How helpful is assignment to a regular (underway) fire party to show your shipmates you have special skills and abilities?	(1)	(2)	(3)	(4)	(5)

The next statements deal with whether assignment to a fire party aboard your ship is a desirable assignment.

	Very Desirable	Desirable	Neither Desirable or Undesirable	Undesirable	Very Undesirable
20. How would you consider assignment to an in-port fire party?	(1)	(2)	(3)	(4)	(5)
21. How would you consider assignment to a regular (underway) fire party?	(1)	(2)	(3)	(4)	(5)
22. How do you consider assignment to this course for fire fighting training?	(1)	(2)	(3)	(4)	(5)

The following paired statements deal with what are considered appropriate objectives in fighting a fire. Please select one objective from each pair that you consider as most important. Mark the item in each pair that you feel is most important. Although some pairs may appear equally important you must select one item only from each pair.

23. ( ) Remove/provide injured personnel with medical assistance
    ( ) Prevent further damage to the ship that may result from fire fighting efforts

24. ( ) Protect myself from risk of personal injury
    ( ) Control/extinguish the fire

25. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Protect others in the fire party from injury

26. ( ) Contain/extinguish the fire
    ( ) Remove/provide injured personnel with medical assistance

27. ( ) Protect others in the fire party from injury
    ( ) Protect myself from risk of personal injury

28. ( ) Contain/extinguish the fire
    ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)

29. ( ) Remove/provide injured personnel with medical assistance
    ( ) Protect others in the fire party from injury

30. ( ) Prevent further damage to the ship that may result from fire fighting efforts (for example, flooding)
    ( ) Protect myself from risk of personal injury

31. ( ) Protect others in the fire party from injury
    ( ) Contain/extinguish the fire

32. ( ) Protect myself from risk of personal injury
    ( ) Remove/provide injured pesonnel with medical assistance

The following paired statements deal with the value of training that you may have received during the Advanced Fire Fighting Team Training Course (J-495-0424). Consider each pair of statements and select one statement from each pair that you consider as most helpful during your training. Although some pairs may appear equally helpful you must select one item from each pair.

34. ( ) Training in how to perform other than my own duties on the fire party (cross training)
    ( ) Training in how to perform my individual duties as required by my position

35. ( ) Training was not necessary because of my previous knowledge and training
    ( ) Training in teamwork and communications

36. ( ) Training in how to perform my individual duties as required by my position
    ( ) Training in how to properly use fire fighting equipment

37. ( ) Training in how to properly use fire fighting equipment
    ( ) Training in how to perform other than my own duties on the fire party (cross training)

38. ( ) Training in how to perform my individual duties as required by my position
    ( ) Training in teamwork and communications

39. ( ) Training in how to perform other than my own duties on the fire party
    ( ) Training was not necessary because of my previous knowledge and training

40. ( ) Training in teamwork and communications
    ( ) Training in how to properly use fire fighting equipment

41. ( ) Training was not necessary because of my previous knowledge and training
    ( ) Training in how to perform my individual duties as required by my position

42. ( ) Training in teamwork and communications
    ( ) Training in how to perform other than my own duties on the fire part (cross training)

43. ( ) Training in how to properly use fire fighting equipment
    ( ) Training was not necessary because of my previous knowledge and training

APPENDIX E

INSTRUCTOR QUESTIONNAIRE

INSTRUCTOR EVALUATION QUESTIONNAIRE
ADVANCED FIRE FIGHTING TEAM TRAINING COURSE

J-495-0424
FORM 0

This questionnaire is designed to obtain information concerning the Advanced Fire Fighting Team Training course and utilization of Device 19F1 in support of course objectives.

Please assess the following characteristics of Device 19F1, the Advanced Fire Fighting Trainer, by marking the most appropriate number. As a guide for these ratings consider the following descriptions.

1. Highly Realistic, there are no differences between the training situation and an actual fire.

2. Realistic, there are only minor differences between the training situation and an actual fire that will probably not affect training.

3. Questionable Realism, there are differences between the training situation and an actual fire that may or may not affect training.

4. Unrealistic, there are major differences between the training situation and an actual fire that will probably affect training.

5. Very Unrealistic, the training situation bears little resemblance to an actual fire.

		High Realistic	Realistic	Questionable Realism	Unrealistic	Very Unrealistic
1.	Growth of fire	(1)	(2)	(3)	(4)	(5)
2.	Spread of fire	(1)	(2)	(3)	(4)	(5)
3.	Reflash Characteristics of the fire	(1)	(2)	(3)	(4)	(5)
4.	Torching of the fire	(1)	(2)	(3)	(4)	(5)
5.	Simulated Smoke	(1)	(2)	(3)	(4)	(5)
6.	Simulated AFFF	(1)	(2)	(3)	(4)	(5)
7.	Simulated PKP	(1)	(2)	(3)	(4)	(5)
8.	Reaction of fire to extinguishing agent AFFF	(1)	(2)	(3)	(4)	(5)
9.	Reaction of fire to extinguishing agent PKP	(1)	(2)	(3)	(4)	(5)
10.	Reaction of fire to extinguishing agent water	(1)	(2)	(3)	(4)	(5)
11.	Equipment in repair lockers	(1)	(2)	(3)	(4)	(5)
12.	Location of repair lockers	(1)	(2)	(3)	(4)	(5)
13.	Proper placement of fire fighting equipment in trainer (for example, hose reels)	(1)	(2)	(3)	(4)	(5)

Rate difficulties teams encounter in coping with simulated fires by marking the appropriate number. As a guide for these difficulties consider the following descriptions.

1. Very Easy, the training situation provides environment, materials and/or equipment that will probably not be avilable in an actual fire.

2. Easy, the training situation provides environment materials and/or equipment that are better than would be encountered in an actual fire.

3. Neutral, the training situation is very much the same as would be encountered in an actual fire.

4. Difficult, the training situation imposed conditions that could not be expected in an actual fire.

5. Very Difficult, the training situation imposed conditions that are probably worse than an actual fire.

	Very Easy	Easy	Neutral	Difficult	Very Difficult
14. Orienting and forming the fire party	(1)	(2)	(3)	(4)	(5)
15. Access to simulated fires	(1)	(2)	(3)	(4)	(5)
16. Obscured vision due to smoke	(1)	(2)	(3)	(4)	(5)
17. Communication within the fire party	(1)	(2)	(3)	(4)	(5)
18. Scene leader's control of the fire party	(1)	(2)	(3)	(4)	(5)
19. Communication with Damage Control Central	(1)	(2)	(3)	(4)	(5)

Assess the following instructional features of Device 19F1 by marking the most appropriate number. As a guide for these ratings consider the following descriptions.

1. Excellent, features are optimal and could not be improved.

2. Good, features are useful and are a definite asset to aiding the instructor in achieving course objectives.

3. Adequate, features are such that minimal provisions are made to assist the instructor.

4. Poor, features are such that improper or inadequate design can be overcome with some effort by instructors.

5. Unacceptable, features are such that improper or inadequate design cannot be overcome even with considerable effort.

		Excellent	Good	Adequate	Poor	Unacceptable
20.	Observation of student performance	(1)	(2)	(3)	(4)	(5)
21.	Provide students with problems of increasing difficulty	(1)	(2)	(3)	(4)	(5)
22.	Allows instructor to provide timely feedback to students	(1)	(2)	(3)	(4)	(5)
23.	Provides good communication between instructors and students	(1)	(2)	(3)	(4)	(5)
24.	Provides proper facilities to brief, debrief and critique students	(1)	(2)	(3)	(4)	(5)
25.	Provides adequate safeguards for students and instructors	(1)	(2)	(3)	(4)	(5)
26.	Aids in grading or recording student performance	(1)	(2)	(3)	(4)	(5)
27	Supports and integrates platform instruction	(1)	(2)	(3)	(4)	(5)
28	Requires minimal amount of equipment or material to support course and/or device	(1)	(2)	(3)	(4)	(5)

The following paired statements deal with training benefits that may be realized from Device 19F1. Consider each pair of statements and select one statement from each pair that you consider as the most beneficial. Although some pairs may appear as providing equal benefit, you must select one item only from each pair.

29. ( ) Provides safety for students and instructors
    ( ) Provides realistic fires

30. ( ) Provides realistic shipboard environment
    ( ) Provides instructional aid to support classroom instruction

31. ( ) Provides realistic fires
    ( ) Provides little or no benefit over previous methods

32. ( ) Provides instructional aid to support classroom instruction
    ( ) Provides safety for students and instructors

34. ( ) Provides little or no benefit over previous methods
    ( ) Provides realistic shipboard environment

34. ( ) Provides instructional aid to support classroom instruction
    ( ) Provides realistic fires

35. ( ) Provides safety for students and instructors
    ( ) Provides little or no benefit over previous methods

36. ( ) Provides realistic fires
    ( ) Provides realistic shipboard environment

37. ( ) Provides little or no benefit over previous methods
    ( ) Provides instructional aid to support classroom instruction

38. ( ) Provides realistic shipboard environment
    ( ) Provides safety for students and instructors

APPENDIX F

SAMPLE DATA PRINTOUT
(DEEP FAT FRYER EXERCISE)

SAMPLE DATA PRINTOUT
(Deep Fat Fryer Exercise)

TIME		AIR QUALITY DATA				STREAM	SMOKE
	02	CO2	CO	HC	NOX		
006	247	009	011	000	000	4	OFF
011	247	009	011	000	000	4	OFF
016	247	009	012	000	000	4	OFF
021	247	011	011	000	000	4	OFF
026	246	013	011	000	000	4	OFF
031	246	018	011	000	000	4	OFF
036	246	046	012	000	000	4	OFF
041	243	083	012	000	000	4	OFF
046	239	090	012	000	000	4	OFF
051	238	092	012	000	000	4	ON
056	237	084	012	000	000	4	ON
061	238	077	013	000	000	4	ON
066	238	083	012	000	000	4	ON
071	238	076	012	000	000	4	ON
076	239	083	013	000	000	4	ON
081	238	082	012	000	000	4	ON
086	238	089	014	000	000	4	ON
091	237	089	014	000	000	4	ON
096	237	087	014	000	000	4	ON
101	237	085	014	000	000	4	ON
106	237	093	015	000	000	4	ON
111	236	091	015	000	000	4	ON
116	236	081	014	000	000	4	ON
121	237	084	014	000	000	4	ON
126	237	091	015	000	000	4	ON
131	236	092	015	000	000	4	ON
136	236	084	014	000	000	4	ON
141	237	085	015	000	000	4	ON
146	237	092	016	000	000	4	ON
151	236	088	015	000	000	4	ON
156	236	085	015	000	000	4	ON
161	237	087	016	000	000	4	ON
166	236	092	016	000	000	4	ON
171	236	086	015	000	000	4	ON
176	236	087	016	000	000	4	ON
181	236	091	016	000	000	4	ON
186	236	091	016	000	000	4	ON
191	236	091	015	000	000	4	ON
196	236	089	015	000	000	4	ON
201	236	093	016	000	000	4	ON
206	236	088	016	000	000	4	ON
211	236	093	015	000	000	4	ON
216	235	092	016	000	000	4	ON
221	235	094	016	000	000	4	ON
226	235	098	016	000	000	4	ON
231	235	098	016	000	000	4	ON
236	235	095	017	000	000	4	OFF
241	235	084	015	000	000	4	OFF
246	236	093	014	000	000	4	OFF
251	236	094	013	000	000	4	OFF
256	235	092	012	000	000	4	OFF
261	235	094	013	000	000	4	OFF
266	235	092	011	000	000	4	OFF
271	235	092	012	000	000	4	OFF
276	235	091	012	000	000	4	OFF
281	235	094	011	000	000	4	OFF
286	235	092	013	000	000	4	OFF
291	235	089	012	000	000	4	OFF
296	236	090	012	000	000	4	OFF
301	236	094	012	000	000	4	OFF
306	236	088	012	000	000	4	OFF
311	236	091	011	000	000	4	OFF
316	236	097	011	000	000	4	OFF
321	235	092	011	000	000	4	OFF
326	236	095	012	000	000	4	OFF
331	236	089	012	000	000	4	OFF
336	236	084	011	000	000	4	OFF
341	237	085	011	000	000	4	OFF
346	237	095	011	000	000	4	OFF
351	236	089	012	000	000	4	OFF
356	236	093	011	000	000	4	OFF
361	236	091	012	000	000	4	OFF
366	236	071	011	000	000	4	OFF

TIME	FIREPLACE H-F	PARAMETERS	BURN TIME	PILOT TIME	AGENTS
368	FRYER/H000	F-SPREAD=005 H-SPREAD=000 H-EXT=010	350	017	H2O=012 BELL=000 PKP=004 H2O+PKP=004

••••••••••••••••••••••••••••••••EMERGENCY STOP••••••••••••••••••••••••••••••••4

APPENDIX G

PERFORMANCE GRADE SHEETS

ADVANCED SHIPBOARD FIRE FIGHTING TEAM TRAINING J-495-0424

FLEET TRAINING CENTER, NORFOLK, VIRGINIA

TEAM MEMBER CHECKLIST FOR Scene Leader

SHIP/ORGANIZATION _____

EXERCISE NO. _____

ADMINISTERING INSTRUCTOR _____

OVERALL GRADE (CIRCLE ONE):

MIN SAT SAT HI SAT UNSAT

INSTRUCTOR'S INITIALS/DATE _____

ACTION NUMBER	ACTION DESCRIPTION	EO	SAT Min	SAT Sat	SAT Hi	UNSAT	SEE REMARKS
1	Drew equipment from repair locker ____ clipboard ____ message blanks ____ pencil ____ helmet with head lantern	1.1					
2	Mustered fire party	1.1					
3	Route to scene ____ designated ____ followed	1.1					
4	Arrived in ____ minutes (standard: seven)	1.1					
5	Directed investigation	1.2					
6	Directed isolation of fire	1.2					
7	Ordered power and ventilation secured	1.2					
8	Ordered hoses ____ rigged ____ charged	1.2					
9	Ordered telephones ____ set up ____ tested	1.2					
10	Reported status to D.C.C. (fire)	1.2					
11	Reported manned and ready in ____ minutes (Standard: Nine)	1.2					
12	Selected agent	1.3					
13	Directed compartment entry	1.3					
14	Reported progress (fire under control)	1.3					
15	Ensured safe, effective progress	1.4					
16	Changed agents (if applicable)	1.4					
17	Supervised hose handlers	1.4					
18	Reported progress (fires out)	1.4					
19	Directed casualty recovery: ____ Personnel ____ equipment	1.5					
20	Ordered reflash watch set	1.6					
21	Reported progress (reflash watch set)	1.6					
22	Directed team in equipment stowage	1.7					
23	Ensured equipment properly stowed	1.7					

REMARKS:

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ADVANCED SHIPBOARD FIRE FIGHTING TEAM TRAINING J-495-0424

FLEET TRAINING CENTER, NORFOLK, VIRGINIA

TEAM MEMBER CHECKLIST FOR No. 1 Nozzleman

SHIP/ORGANIZATION _____

EXERCISE NO. _____

ADMINISTERING INSTRUCTOR _____

OVERALL GRADE (CIRCLE ONE):

MIN SAT | SAT | HI SAT | UNSAT

INSTRUCTOR'S INITIALS/DATE _____

ACTION NUMBER	ACTION DESCRIPTION	EO	SAT Min	SAT Sat	SAT Hi	UNSAT	SEE REMARKS
1	Drew equipment from repair locker ____ OBA ____ cannister ____ gloves ____ helmet with head lantern	2.1					
2	Followed designated route to scene	2.1					
3	Arrived in ____ minutes (standard: seven)	2.1					
4	OBA ____ donned ____ activated ____ removed ____ disposed ____ cleaned and stowed	2.2					
5	Assisted accessman by cooling access fitting	2.3					
6	Identified class of fire ____ correctly ____ made oral report	2.4					
7	Extinguished class A fire in ____ minutes (standard: fourteen) ____ used high velocity fog ____ used solid stream	2.5					*
8	Extinguished class B fire in ____ minutes (standard: fourteen) ____ applied ½" layer of AFFF	2.6					*
9	Activated twin agent fire extinguishing system. ____ DC deck ____ engine room or fire room	2.7					*
10	Extinguished engine room or fire room fire within ____ minutes (standard: fourteen). ____ Used twin agent fire extinguishing system ____ followed correct procedures	2.9					*
11	Extinguished a class C fire in ____ minutes (standard: fourteen). ____ Used correct CO_2 agent ____ secured power ____ grounded CO_2 bottle	2.9					*
12	Extinguished a deep fat fryer fire in ____ minutes (standard: fourteen). ____ Knocked down flames with PKP. ____ Secured PKP after low velocity fog was secured	2.10					*
13	Reported progress to scene leader ____ used standard DC terminology ____ location ____ class ____ extent ____ fire under control ____ fire out ____ reflash watch set	2.11					
14	Set reflash watch	2.12					

REMARKS

ADVANCED SHIPBOARD FIRE FIGHTING TEAM TRAINING J-495-0424

FLEET TRAINING CENTER, NORFOLK, VIRGINIA

TEAM MEMBER CHECKLIST FOR: No. 2 Nozzleman

SHIP/ORGANIZATION: _____

EXERCISE NO.: _____

ADMINISTERING INSTRUCTOR: _____

OVERALL GRADE (CIRCLE ONE):

MIN SAT | SAT | HI SAT | UNSAT

INSTRUCTOR'S INITIALS/DATE: _____

ACTION NUMBER	ACTION DESCRIPTION	EO	SAT Min	SAT Sat	SAT Hi	UNSAT	SEE REMARKS	
1	Drew equipment from repair locker ____ OBA ____ cannister ____ gloves ____ helmet with head lantern	3.1						
2	Followed designated route to scene	3.1						
3	Arrived in ____ minutes (standard: seven)	3.1						
4	OBA ____ donned ____ activated ____ removed ____ disposed ____ cleaned and stowed	3.2						
5	Assisted accessman by cooling access fitting	3.3						
6	Provided heat shield for both nozzlemen during class B fire. ____ Shield was continuous	3.5						*
7	Provided heat shield for both nozzlemen during class B fire. ____ Shield was continuous	3.6						*
8	Provided heat shield for both nozzlemen during oil spray or bilge fire. ____ Shield was continuous	3.8						*
9	Extinguished a deep fat fryer fire in ____ minutes (standard: fourteen). ____ Applied low velocity fog above fire after PKP. ____ Secured low velocity fog after 3 seconds.	3.10						*
10	Set reflash watch. ____ Backed out slowly. ____ Agent kept readily available.	3.11						

REMARKS:

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ADVANCED SHIPBOARD FIRE FIGHTING TEAM TRAINING J-495-0424

FLEET TRAINING CENTER, NORFOLK, VIRGINIA

TEAM MEMBER CHECKLIST FOR Hoseman

SHIP/ORGANIZATION _____

EXERCISE NO. _____

ADMINISTERING INSTRUCTOR _____

OVERALL GRADE (CIRCLE ONE):

MIN SAT | SAT | HI SAT | UNSAT

INSTRUCTOR'S INITIALS/DATE _____

ACTION NUMBER	ACTION DESCRIPTION	EO	SAT Min	SAT Sat	SAT Hi	UNSAT	SEE REMARKS	
1	Drew equipment from repair locker ____ OBA ____ cannister ____ gloves ____ helmet with head lantern	4.1						
2	Followed designated route to scene	4.1						
3	Arrived in ____ minutes (standard: seven)	4.1						
4	OBA ____ donned ____ activated ____ removed ____ disposed ____ cleaned and stowed	4.2						
5	Rigged hoses to scene in ____ minutes	4.3						
6	Attached correct nozzles to hoses	4.3						
7	Rigged hoses to correct side of access fitting	4.3						
8	Tended fire hose for 2 minutes	4.4						*
9	Restowed hoses correctly (MRC-A634-W-1)	4.5						
10	Rigged jumper hose in ____ minutes (standard: four). ____ leaks	4.6						*
11	Secured correct isolation valves	4.6						*

REMARKS:

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ADVANCED SHIPBOARD FIRE FIGHTING TEAM TRAINING J-495-0424

FLEET TRAINING CENTER, NORFOLK, VIRGINIA

TEAM MEMBER CHECKLIST FOR Plugman

SHIP/ORGANIZATION _____

EXERCISE NO. _____

ADMINISTERING INSTRUCTOR _____

OVERALL GRADE (CIRCLE ONE):

MIN SAT | SAT | HI SAT | UNSAT

INSTRUCTOR'S INITIALS/DATE _____

ACTION NUMBER	ACTION DESCRIPTION	EO	SAT Min	SAT Sat	SAT Hi	UNSAT	SEE REMARKS	
1	Drew equipment from repair locker ___ helmet ___ flashlight	5.1						
2	Followed designated route to scene	5.1						
3	Arrived on scene in ___ minutes (standard: seven)	5.1						
4	Charged fire hose ___ opened fireplug fully (¼ turn back) ___ charged hose slowly ___ opened Y-gate fully	5.3						
5	Dumped and closed marine strainer	5.4						*
6	Secured fire station correctly (MRC-A634-W-1)	5.5						
7	Secured a ruptured or wild hose within 3 to 5 seconds	5.6						*
8	Restowed fire station correctly	5.7						

REMARKS:

171

ADVANCED SHIPBOARD FIRE FIGHTING TEAM TRAINING J-495-0424

FLEET TRAINING CENTER, NORFOLK, VIRGINIA

TEAM MEMBER CHECKLIST FOR Accessman

SHIP/ORGANIZATION _____

EXERCISE NO. _____

ADMINISTERING INSTRUCTOR _____

OVERALL GRADE (CIRCLE ONE):

MIN SAT | SAT | HI SAT | UNSAT

INSTRUCTOR'S INITIALS/DATE _____

ACTION NUMBER	ACTION DESCRIPTION	EO	SAT Min	SAT Sat	SAT Hi	UNSAT	SEE REMARKS
1	Drew equipment from repair locker ____ pry bar ____ sledge ____ helmet ____ gloves	6.1					
2	Followed designated route to scene	6.1					
3	Arrived on scene in ____ minutes (standard: seven)	6.1					
4	Opened access fitting to a compartment on fire ____ hinge side first ____ slowly	6.2					
5	Closed access fitting to a compartment on fire ____ knife edge sealed against gasket	6.3					
6	Reported progress to scene leader. ____ Type of fitting ____ number of fitting ____ status of fitting	6.4					

REMARKS:

172

ADVANCED SHIPBOARD FIRE FIGHTING TEAM TRAINING J-495-0424
FLEET TRAINING CENTER, NORFOLK, VIRGINIA

TEAM MEMBER CHECKLIST FOR Investigator

SHIP/ORGANIZATION _____

EXERCISE NO. _____

ADMINISTERING INSTRUCTOR _____

OVERALL GRADE (CIRCLE ONE):

MIN SAT | SAT | HI SAT | UNSAT

INSTRUCTOR'S INITIALS/DATE _____

ACTION NUMBER	ACTION DESCRIPTION	EO	SAT Min	SAT Sat	SAT Hi	UNSAT	SEE REMARKS
1	Drew equipment from repair locker ____ OBA ____ cannister ____ gloves ____ helmet with head lantern ____ message blanks ____ pencil ____ investigators kit.	7.1					
2	OBA ____ donned ____ activated ____ removed ____ disposed ____ cleaned and stowed.	7.2					
3	Located fire in ____ minutes (standard: five)	7.4					
4	Checked bulkheads, decks, overheads and compartment interiors.	7.4					
5	Correctly identified class of fire	7.5					
6	Report to scene leader status of fire within ____ minutes (standard: six) ____ location ____ extent ____ class	7.6					
7	Used standard DC message blanks and symbology	7.6					

REMARKS:

173

ADVANCED SHIPBOARD FIRE FIGHTING TEAM TRAINING J-495-0424

FLEET TRAINING CENTER, NORFOLK, VIRGINIA

TEAM MEMBER CHECKLIST FOR Phonetalker/Messenger

SHIP/ORGANIZATION _____

EXERCISE NO. _____

ADMINISTERING INSTRUCTOR _____

OVERALL GRADE (CIRCLE ONE):

MIN SAT | SAT | HI SAT | UNSAT

INSTRUCTOR'S INITIALS/DATE _____

ACTION NUMBER	ACTION DESCRIPTION	EO	SAT Min	SAT Sat	SAT Hi	UNSAT	SEE REMARKS
1	Drew equipment from repair locker ____ sound powered telephone ____ lighted clipboard ____ pencil ____ phonetalkers helmet	8.1					
2	Followed designated route to scene	8.1					
3	Arrived on scene in ____ minutes (standard: seven)	8.1					
4	Connected telephone to correct circuit	8.2					
5	Used standard phonetalking procedures	8.2					
6	Sent, received and relayed reports	8.2					
7	Connected oral reports to written and written reports to oral	8.2					
8	Restowed telephones in the correct manner and in the correct place	8.3					

REMARKS:

174

APPENDIX H

SAMPLES AND CRES SUMMARY ANALYSIS OF READABILITY

The Maintenance panel consists of a (rotary) selector control, a SAFETY INTERLOCK indicator for each of four fireplaces, a PILOT INDICATOR for each pilot light in each fireplace, power supply indicators for +5V and +28V power supplies, blown fuse indicators for the (console) and each compartment, an elapsed time indicator, a PROPANE indicator and an INDICATOR TEST toggle switch.(*061*) The selector control is used to (select)(*CHOOSE/*)FIRE CONTROL panel, BLDG CONTROL panel, DATA ENTRY(AND DISPLAY) panel or MAINT. panel for lamp test. When the INDICATOR TEST toggle is set (*PASSIVE VOICE*) to either the right or left position (*SET/*) All indicators on the(selected)(*CERTAIN/*) panel will light, except that the FIRE CONTROL PANEL must be tested (*PASSIVE VOICE*) by (selecting)(*CHOOSING/*) one fireplace row at a time by pressing the first pushbutton indicator at the left end of the FIRE CONTROL panel row.(*041*) To avoid excessive current flow, the test will be (inhibited) if more than one fireplace is (selected).(*CERTAIN*) On the Maintenance panel, a SAFETY INTERLOCK indicator will light if (there is) (*!!AVOID!!*) an open interlock in the fireplace associated with the interlock.(*023*)

WORD NOT ON COMMON WORD LIST

NUMBER OF WORDS IN SENTENCE

SUGGESTED WORD SUBSTITUTION

PASSIVE VERB TENSE USED

SUGGESTED WORD SUBSTITUTE

PASSIVE VERB TENSE USED

NUMBER OF WORDS IN SENTENCE

WORD NOT ON COMMON WORD LIST

SUGGESTED WORD SUBSTITUTION

AWKWARD PHRASE

GRADE LEVEL: 13.2
(Based on DOD Readability Standard)

WORDS NOT ON COMMON WORD LIST
CONSOLE ROTARY

If any pilot (fails to)(*DOES NOT/DOESN'T*) ignite or is
extinguished after ignition, (it will be)(*AVOID/*) indicated
on the maintenance panel. Once all the pilots have been
(established)(*SET UP/PROVED*)(via)(*BY WAY OF/*) individual
flame relays, one per burner, and a pilot has been [inadvertantly]
extinguished or a self-check UV flame [sensor] fails, the flame
relay for the associated burner will (initiate)(*START/*) safety
shut down for that burner, causing the associated pilot indicator
to go out and the HDWR MALF indicator to light.(*058*) At this
time (it will be)(*AVOID/*) up to the instructor to (determine)
(*DECIDE/FIGURE*) whether he wishes to (continue)(*KEEP ON/*) the
training exercise or shut down the system and investigate the
malfunction.(*029*) To (determine)(*DECIDE/FIGURE*) whether the
flame failure was caused by (*PASSIVE VOICE*) an extremely heavy
application of PKP or failure of the UV flame [sensor,] the
instructor will [reinitiate] the pilot start-up sequence.(*030*)
If a hardware malfunction does not exist, the pilot will be
[reignited] and the training may be (continued.)(*KEPT ON/*)

SUGGESTED SUBSTITUTE

AWKWARD PHRASE

WORD NOT ON THE COMMON WORD LIST

NUMBER OF WORDS IN SENTENCE

AWKWARD PHRASE

SUGGESTED SUBSTITUTE

PASSIVE VOICE VERB USAGE

WORD NOT ON COMMON WORD LIST

177

GRADE LEVEL: 16.+
(According to DOD standard)

178

WORDS NOT ON COMMON WORD LIST

reignited reinitiate sensor

APPENDIX I

RESTRUCTURED SAMPLES BASED ON CRES ANALYSIS

The Maintenance Control panel consists of:

a rotary selector control

SAFETY INTERLOCK indicator for each of the four fireplaces

PILOT INDICATOR for each pilot in each fireplace

power supply indicator for +5V and +28V power supplies

blown fuse indicators for the (console) and each compartment ← WORD NOT ON COMMON WORD LIST

elapsed time indicator

PROPANE INDICATOR

INDICATOR TEST goggle switch.

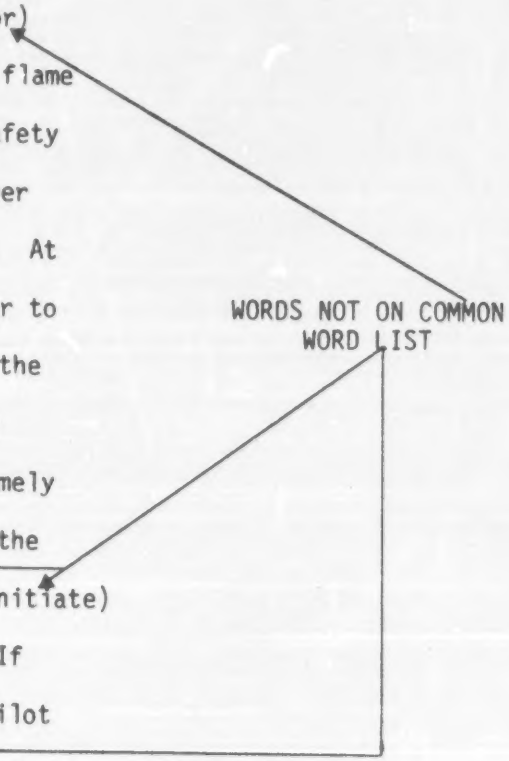
For the lamp test, set the selector control to either the FIRE CONTROL, BLDG CONTROL, DATA ENTRY (AND DISPLAY) or MAINT. Set the INDICATOR TEST toggle to either the right or left position. All indicators on the chosen panel will light except the FIRE CONTROL PANEL. The FIRE CONTROL PANEL must be tested by one fireplace at a time. Test the FIRE CONTROL PANEL by choosing one fireplace row at a time. Press the first pushbutton indicator at the left end of the row. To avoid excessive current flow, the test will be (inhibited) if more than one fireplace is chosen. ← WORD NOT ON COMMON WORD LIST An open interlock in the fireplace will cause the SAFETY INTERLOCK indicator on the maintenance panel to light.

GRADE LEVEL: 10.1
(Based on DOD Readability Standard)

WORDS NOT ON COMMON WORD LIST

console inhibited

The maintenance panel indicator shows if any pilot doesn't ignite or is entinguished after ignition. An individual flame relay lights a pilot at each burner. If a pilot is accidently extinguished or a self-check UV flame (sensor) fails, then the burner will shut down. The flame relay of the associated burner starts the safety shutdown. The pilot indicator for that burner goes out and the HDWR MALF indicator lights. At this time, the instructor must decide whether to continue the training exercise or shut down the system and investigate the malfunction. The malfunction may be caused by either an extremely heavy application of PKP or by a failure of the UV flame (sensor.) The instructor will (reinitiate) the start-up sequence to decide the cause. If a hardware malfunction does not exist, the pilot will (reignite) and the training will continue.



GRADE LEVEL = 7.8
(Based on DOD Readability Standard)

WORDS NOT ON COMMON WORD LIST

reignite

reinitiate

sensor

Technical Report 142

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